PB-230 374

HEALTH RESEARCH IN HOUSING AND ITS ENVIRONMENT. PROCEEDINGS OF THE INVITATIONAL CONFERENCE (IST) HELD IN WARRENTON, VIRGINIA, ON MARCH 17-19, 1970

Environmental Health Service
Rockville, Maryland

19 March 1970

DISTRIBUTED BY:

NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

20.1802:

PB 230 374

PROCEEDINGS of the FIRST INVITATIONAL CONFERENCE on Health Research in Housing and Its Environment

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE · Public Health Service · Environmental Health

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

Library
Environmental Protection Agency
Region VII

Proceedings of
THE FIRST INVITATIONAL CONFERENCE ON HEALTH RESEARCH IN HOUSING AND ITS ENVIRONMENT

Airlie House
Warrenton, Virginia
March 17-19, 1970

Sponsored by the American Public Health Association in cooperation with and supported by the Bureau of Community Environmental Management, Environmental Control Administration, Environmental Health Service, Public Health Service, U.S. Department of Health, Education, and Welfare.

FOREWORD

The first requirement of any living organism—including man— is a suitable environment. Although man is, in truth, the most adaptable of all species, even human adaptive capacities are limited by genetic endowment, and man thrives only in an environment which meets his fundamental physical and psychological needs.

Modern man, beset on all sides by mounting evidence of the chemical, radiological, physical, and psychological hazards of an increasingly technological milieu, is coming to realize that the quality of life is highly dependent upon the quality of his environment.

Of all facets of the human environment, few influence our health and well-being more directly than the dwelling in which we seek shelter, protection, and privacy. This is why the American Public Health Association, in cooperation with the Environmental Health Service, convened a conference of specialists to consider the health aspects of housing.

On April 7, 1970, in his message to Congress on National Housing Goals, the President stated that " . . . continuing efforts on many fronts are required to provide a decent home and suitable living environment for every American family. The Administration, the Congress, private industry and labor must cooperate closely in removing the obstacles and making the commitments necessary . . ."

We in the Environmental Health Service are grateful to the American Public Health Association for its commitment to this National effort and especially for convening the Conference on Health Research in Housing and its Environment. We believe this Conference has helped to clarify the health considerations which should be an integral part of housing rehabilitation and construction and has, therefore, made a positive contribution toward achieving our National housing goals. The record of its proceedings should be of interest to all who share a concern for man and his environment.

Charles C. Johnson Jr

Administrator
Environmental Health Service
Public Health Service
U.S. Department of Health,
Education, and Welfare

We share with the American Public Health Association a real and vital concern for health research in housing and the residential environment. The Bureau of Community Environmental Management is broadly involved with the efforts of communities to manage and influence the physical and social environments in order to protect and enhance our mental and physical well-being.

We are grateful for the cooperation of a number of people in the planning for this Conference. They represented the interests of Federal, State, city and county officials and the areas of environmental design, home building and home building research, redevelopment, and land use.

If any facets of the problems were neglected, it obviously was not due to lack of opportunity for those interested to go on record as to identification of problems or their significance. We are confident that the greater understanding stemming from this Conference will be a sound basis for further development for realistic, workable planning and action.

Robert E. Novick

Robert E. Novick, Director
Bureau of Community
Environmental Management

Preceding page blank

TABLE OF CONTENTS

Page

INTRODUCTION 1

RECOMMENDATIONS

- Workshop Reports and Discussion 5
- Conference Recommendations 35
- Recommendations of the APHA Program Area Committee 37

CONFERENCE HIGHLIGHTS

- Keynote Speeches 41
- Discussion Following Keynote Speeches 55
- Foreign Panel Presentation 60
- Summary of Speech by Ralph J. Johnson 71

CONFERENCE PAPERS

- Synthesis Paper—Conclusions and Recommendations 73
- Abstracts of Position Papers 85
- Papers Contributed to Workshops 106

CONFERENCE ATTENDEES 107

Preceding page blank

INTRODUCTION

BACKGROUNDS, GOALS, AND ACCOMPLISHMENTS

C. L. Senn, Conference Chairman

The extensive planning and preparation necessary to conduct this conference were provided jointly by the Program Area Committee on Housing and Health, American Public Health Association, and the Bureau of Community Environmental Management, Environmental Control Administration, Environmental Health Services.* In addition to providing valuable and extensive services in planning, arranging, and organizing the Conference, the EHS also provided the essential financial support for the Conference itself and development of the position papers and background documentation.

Subjects for the position papers presented at the Conference, which are summarized in this proceedings report, resulted from recommendations contained in "A Report to the Secretary of Health, Education, and Welfare by the Task Force on Environmental Health and Related Problems — A Strategy for a Livable Environment" (June, 1967). The basic goal established by this report was: "... develop, by 1973, through research, basic data sufficient to establish human levels of tolerance for crowding, congestion, noise ..." Early in the study it was apparent that the goal must go far beyond establishing human tolerance. Mitchell's paper on Hong Kong's high density, showing the tremendous capacity for many humans to adapt to grossly crowded and congested living quarters, further emphasizes the need for expanded in-depth research.

The Program Area Committee, APHA, prepared a paper entitled "The Basic Health Principles of Housing and Its Environment." During an extensive review of literature in preparation of this paper, it became apparent that much further research was needed to provide answers to many basic questions concerning housing/health relationships. Lack of sufficient data to form authoritative conclusions in this paper further stimulated interest in a Health Research Conference.

In planning the Conference, special note was taken of the Partnership for Health Act (1966) declaration of Congress toward, "Assuring the highest levels of health attainable for every person, in an environment which contributes positively to healthful individual and family living ..." It also was planned to help answer statements made in the 1968 "Report of the National Commission on Urban Problems to the Congress and the President of the United States — Building the American City." For instance, the report stated in part, "The 1949 (Housing) act calls for a 'suitable' living environment. Presently, there are virtually no codes which establish standards for a suitable living environment," and "Codes should focus on people as well as structures."

Further evidence in support of a comprehensive review of housing/health research appeared in developing administrative guides toward enforcement or eliciting compliance with the Committee's recommended "APHA-PHS Housing Maintenance and Occupancy Ordinance."

Full realization that "housing" includes the whole residential environment led to the concept that more must be learned about the social and physical characteristics requisite for a "healthful" residential environment for various population groups and family characteristics.

Urban sprawl, serious problems of the inner city, segregation by ethnic and economic groups, and the impression that the largest cities are getting too large and too densely populated were all factors which provided motivation for a conference that would focus on "housing/health research."

The Conference Planning Committee recognized the importance of bringing together research authorities from other countries, as well as leaders from the United States; of fully involving those who are active in planning and guiding the nation's housing programs from both government and the private sector; persons who know the problems of minority groups, as well as those who represent the more affluent, and of involving economists who are aware of social and economic problems and limitations. Participation was invited from professional societies, universities, research institutes, state and regional planning groups, builders and developers, and the various Federal agencies involved in this field. They formed a widely diversified group and had a unique opportunity for the exchange of information and ideas.

---

*Agencies of the Public Health Service, Department of Health, Education, and Welfare.

OBJECTIVES

The Conference Planning Committee included representatives from the private sector such as the National Association of Real Estate Boards, the National Association of Home Builders, and organizations of governmental groups such as the Conference of Mayors, etc. They developed these objectives outlined in the Conference announcement:

To bring together housing and health research people with those who design, develop, build, rebuild, manage, regulate, and otherwise influence housing and its environment, in order:

- — to exchange knowledge,
- — to identify areas for study,
- — to recommend priorities,
- — to stimulate research in and the application of knowledge to the provision of healthful housing and neighborhoods.

The need for such a conference was clearly indicated by the magnitude of the problem and the nature and scope of proposed solutions, re:

— The President's Committee on Urban Housing forecast (in 1968) a national need for 27 million new housing units in the decade of the 1970's;

— The National Committee on Urban Growth, mindful of the population explosion and impressed with the European "New Town" developments, proposed (in 1968) that 100 new cities of 100,000 population and 10 cities of 1,000,000 or greater population be built in this nation. There is urgent need for research to establish health criteria for optimizing the design and providing services in these new towns.

— The National Commission on Urban Problems (in 1968) recommended research, testing, and processes whereby a determination of a standard for a "decent home" can be made.

The Conference planning group recognized that lack of coordinated research and study to provide a scientific basis for planning, designing, and managing the residential environment is the major deterrent to modernization of health criteria such as the American Public Health Association's "Planning the Neighborhood."

The Conference program combined plenary sessions with keynote presentations by national leaders, workshop-type group discussions between research specialists and users of research and, finally, presentations of workshop reports and recommendations for discussions by all participants. The sessions ended by adoption of "Recommendations of the Conference."

KNOWLEDGE GAINED

About 150 research scientists, governmental officials, technical specialists, and representatives of the private sector participated in plenary sessions and workshop groups. Their discussions basically confirmed the findings outlined in the position papers: that common beliefs which associate specific disease entities with housing defects are difficult to confirm, or that some such cause-and-effect may not even exist. On the other hand, the groups concluded that social and economic factors are of such great importance in terms of the modern definition of "health" that they must be given high priority in research relating to "housing and health."

Conclusions and recommendations of the

eight workshop groups and recommendations of the Conference as a whole are included in these Proceedings, as well as a "priority" list prepared by members of the Program Area Committee and representatives of the Environmental Health Service. The following represents the Conference Chairman's impressions, evaluations, interpretations, and overall assessment.

The field of housing and its environment is so complex that improvements, solutions, and even goals can be accomplished or established only by a broad inter-disciplinary approach. Similarily, the combined resources of many governmental agencies at all levels must be coordinated with those of the private sector to achieve significant beneficial improvements.

Even though the Conference was oriented toward research, the most lively and spirited discussion related to the broad social, economic, and political issues concerning national goals and policies. Surprisingly, the participants were nearly equally divided on the question of the value and necessity of housing and building codes. There was almost unanimous agreement that housing code enforcement is ineffective unless accompanied by subsidies and other forms of assistance to low income families. Economists pointed out that enforcement of many features of codes necessitates diversion of family funds from needs which the families place at a higher priority level than certain features of housing and building code requirements. Dr. Paul Cornely, president of the APHA, compared the efficient enforcement of milk sanitation codes resulting in the usual spotless condition of the dairy barn with deplorable human living conditions which he observed throughout the country in spite of codes calling for sanitary housing. He raised the question of the sincerity of purpose of officials responsible for housing codes.

The comments most commonly heard at the Conference were on the value and stimulating effects of bringing together research scientists with persons responsible for implementing the results of research; of obtaining exchanges of knowledge among officials and authorities of many countries and the principal, concerned international agencies.

Another notable feature of the Conference was the bold manner in which participants recommended discarding venerable theories. In essence, they said, let us not attempt to justify "requirements" by citing theories which are of questionable scientific stature. Let us accept the fact that we desire and need proper and adequate space and facilities for comfortably, efficiently and, insofar as possible, pleasantly accomplishing our tasks and doing those things we want and need to do in our living units and their environment. Let us not spend too much effort on attempting to link overcrowding, density, and congestion with respiratory disease or even with mental disease.

An example of new knowledge from research data was presented by Dr. Longley of the American Gas Institute. APHA sleeping room "volume" requirements were long based upon the theory that "air leakage" of 10 cubic feet per minute resulted when rooms contained 400 cubic feet per occupant. Longley's studies showed that modern construction materials and methods reduce this "leakage" up to 100 fold.

Several groups, including those who considered ventilation and the thermal environment, called attention to the hazards of basing "standards" solely on studies involving only normal, healthy, young adults. They show that some room occupants need temperatures at least five degrees above the "minimum" of 68°F recommended in some codes. Similarly, they concluded that for some population groups in certain climates, air conditioning is truly a health necessity and, in some cases, a requirement for survival.

Injuries in and around the home were pointed to as the greatest single, measurable health hazard of the residential environment. Encouraging reports described epidemiological methodologies of the Public Health Service which are correlating injuries with causes that may be correctable or avoidable. Major research and effort was recommended to expand such programs and to strengthen teamwork among such agencies as HUD, HEW, Bureau of Standards, and DOT, working with such private agencies as the National Safety Council and APHA.

The Conference was as concerned with measures to improve the worst housing situations as it was in guiding new developments. One focus was on how to cope with and improve conditions in the poorest of urban and rural housing areas. A second was how to design, plan, arrange, locate, orient, and organize new, large-scale developments to most effectively satisfy broad health needs. Workshop Group VIII produced a comprehensive list of recommendations for dealing with the first problem and Group IV an equally impressive list of programs, goals, and research relating to new towns and large-scale developments.

A long-time interest of APHA, housing and environmental appraisal, drew a wide variety of authorities from international and national agencies. Of prime interest was use of computer and statistical techniques, coupled with efficient and rapid methods, for obtaining and maintaining an inventory of the quantity and quality of the nation's housing stock. Several methods of making rapid surveys, such as the Environmental Health Service's NEEDS programs, were discussed. A large-scale effort to perfect and validate methodologies was strongly recommended. In this, as in all other discussions, the program must include criteria for evaluation of the residential environment.

KEY ISSUES

CODE ENFORCEMENT

The Chairman believes a major, key question lies in the interpretation of several of the Conference's rather startling issues. Large-scale, retroactive enforcement of building code provisions in older neighborhoods occupied by low income families, without subsidy and by "punitive" enforcement, have dealt "code enforcement" a serious blow. The participants, as indicated by the comprehensive recommendations of Group VIII, would establish priorities so that vigorous and massive effort would be made to include human and social needs and values in community improvement programs. They also proposed a combination of programs and methods for "staged" or "incremental" action to tackle "first things first;" to not forsake the families now living under grossly substandard conditions in our pursuit of "long-range" urban renewal efforts.

Similarly, there appeared to be strong support for HUD's new approaches toward "performance standards" and by "Operation Breakthrough" to overcome the restrictive and unnecessary features of traditional, restrictive codes. This will lead to an in-depth determination of what "code" features are truly desirable or necessary.

FUTURE?

The Conference and the work which preceded "Airlie House" did achieve a major objective. They produced a synthesis of knowledge and opinion based on past research and investigations. It is now clear that future effort should not focus on reviewing previous studies but should be directed toward research and large-scale field studies of the type recommended by several workshop groups. The health and allied professions must rise to the challenge of providing answers to the many questions raised by the Conference. In doing so, means must be found to follow up on the excellent spirit of international, interagency, and multiple discipline Government-private sector collaboration which characterized the Conference.

RECOMMENDATIONS

A. Recommendations of each of the eight workshops are included with summaries of workshop reports and discussions. By definition, workshops emphasized free discussion, exchange of ideas, and practical application of skills and principles. The workshop summaries and discussions which follow are evidence of realistic approaches to problems.

B. Recommendations of the Conference.

C. Recommendations of the Program Area Committee of the American Public Health Association.

WORKSHOP NO. 1—THE EPIDEMIOLOGY OF HOUSING AND ITS ENVIRONMENT

Co-chairmen: Matthew P. Dumont, M.D.
Professor Moshe Shapiro

Professor Shapiro:

Workshop No. 1 was given the title "The epidemiology of housing and its environment." I presume that the title indicates that there is some area of disease we were to study in considering "the epidemiology of housing and its environment."

In general, what conclusions we came to are as follows: That the epidemiologic foundation for space and other housing standards have been the basis for a strategy of control and prevention of the spread of infectious disease. Since the contemporary relevance of housing standards to the control of infectious diseases is greatly diminished, they can no longer be justified exclusively on the basis of prevention of those diseases. However, the relationship of housing to health, including physical, social, and mental well-being, now takes on increasing importance. Consequently, new epidemiological endeavors are required to assure "healthful" housing in the United States.

The costs of home accidents, the lack of safety in housing design and equipment, the many toxic chemicals which find their way into the home and the extent to which housing and its environment contribute to isolation, loneliness, depression and other mental disorders underscore the importance of the health research we believe to be essential and which we recommend in these rather generalized following statements.

The first recommendation we'd like to make actually has been developed overnight; after our total written recommendations were developed. All but one or two of the workshops have not seen it but I would believe that all of them would subscribe to it.

A substantial portion of the relationships between poverty and disease are housing dependent. During the present period an opportunity exists to evaluate this in connection with the rent supplement and income maintenance programs.

I. *We recommend that studies of changes in infant mortality rates, in Medicare and Medicaid costs, and of other yardsticks of health be undertaken in order to test whether the rent supplement programs or income maintenance programs or neither lead to changes in these rates and costs.*

Then, another general area of recommendation would read as follows:

II. *We recommend that a "safe-house" development and demonstration program be initiated to insure marketability, safety and efficacy of the product of the housing industry. We recommend that a level of effort of 40 million dollars be appropriated for the first program year. The level of effort should be increased by 10 million dollars per year to a fifth year level of 80 million dollars, at the end of which an evaluation be made with a view to establishing national housing safety standards and further development of housing safety in the light of program findings and current technology. An essential part of this program and its evaluation will be the human factors analysis of the home and its safety features.*

Then we worked on what we believe to be a series of recommendations which may be grouped under "III."

III. *For this series of some eight recommendations we believe that a similar level of effort as for the "safe-home" program must be applied to studies and research.*

A. *The first objective is the identification of populations at exceptionally high risk under conditions of housing and environmental inadequacy. For example, the elderly, those with sensory and motor impairment, and children.*

B. *A controlled study be made on the use of space within the housing shells, as*

Preceding page blank

determined by needs and desires of the residents. The design features which encourage interactions of households within the structure must be included.

C. *In collaboration with the Armed Forces Epidemiological Board, conduct large scale prospective studies on the effect of housing and its environment on health among military personnel and their dependents.*

D. *Comparative studies of the physical and social health indices resulting from various design features and operating factors and their effect on a sense of community within housing developments. The psycho-social impact of the planning, operation, and/or ownership of homes should be evaluated.*

E. *Studies be undertaken to identify the implications of changing technologies and mobility patterns on community feeling and behavior.*

F. *The development of comparative studies on different forms of student housing and its effect on student performance and health.*

G. *The use of epidemiology to study the effects of housing code administration and enforcement.*

H. The last in this series of recommendations relates to the maintenance of the home at a high level of quality and is as follows: *Research should be undertaken on the possibilities of upgrading inadequate housing conditions through the intervention of agents (people — not things) acting as "cultural bridges."*

IV. The Workshop felt that these were specific to our charge of "epidemiology of housing and its environment." But it also felt that it should make suggestions for recommendations of the Conference as a whole. Obviously we hope that our recommendations will also be the recommendations of the Conference and that they will really have meaning to all of the workshop sessions. These are three in number, as follows:

A. *That there be an extensive distribution of reports concerned with housing and health such as those derived from the U.N., the World Health Organizations and from other countries.* (In other words, we should develop the means of distribution of this kind of information to all people engaged in housing endeavors and to agencies working in the field. Present distribution of available literature of this kind is quite inadequate.)

B. *That a system be developed to invite consultative missions from the World Health Organization and the United Nations to advise various of the several international housing agencies and countries other than the U.S. on the health implications of housing.*

C. *That there be developed an extensive exchange of programs of students and scholars of various other countries and intergovernmental agencies on the study of health implications of housing.*

These are the recommendations of our workshop.

The suggestion was approved.

Professor Lemkau:

Several of the recommendations incorporate research in housing on determining social and mental well-being as well as physical well-being. Does this mean that somewhere along the line we ought to make a recommendation for determining significant indicators of this social and mental well-being so that there will be a common denominator for talking about the correlations between the results of the other studies? Otherwise, the meaning is pretty vague, so it seems to me that there should be specific research for this end.

Professor Shapiro:

We had quite a bit of discussion on indicators of social health and social well-being. The implications were that these transcend the specific charge of this workshop. I'd like to hear some more discussions from the members. I felt this concept was implied within our recommendations.

Professor McNall:

Just confirming Paul Lemkau's last statement, he was also present in the Workshop No. 7 and we are seeing need for possible coordination of these two workshops. There are obvious overlapping areas and if there's going to be a total comprehensive research plan on these, we should also bring in the question of temperature and ventilation, the deleterious influences or the beneficial influences of air conditioning and the kinds of air conditioning, recognizing, however, that this also compounds the experimental design and makes it perhaps unduly complex — but it would be hoped that the goals sought by each group could be compromised to the extent to make this a total compatible experimental design.

Dr. Goldsmith:

I think that to stipulate in a resolution some of the methologic niceties would be to make it unduly prolonged. I certainly agree on the importance of using standardized procedures, but this is generally thought to be implicit in any epidemiologic design and, while it would be highly important to do this in carrying out such a task, to designate that the task needs to be done and get support for its conduct seems to us the first step.

While I have the floor I think I might also reflect some of the thinking of the Task Force which we didn't quite put into formal form. This was partly because we weren't quite sure what to say, but it also had to do with the fact that the recommendations are really addressed to a number of different agencies, organizations and groups. We have a hope and, I would say, almost the implicit assignment of heavy responsibility to the APHA to provide, through its Program Area Committee, a focus for not only relating to the various agencies and for coordination but in helping to find out which agency might, under different circumstances, undertake which portions. Also involved is how to represent the Conference and the professions involved in urging support for these recommendations.

Prof. Lemkau:

I would like to congratulate this group on having included the proposed evaluations of the effect of utilizing the services of people of various skills, in combination with the effect of structure design, etc. It may be that when you have the congested situation that we have heard about, as in Hong Kong, resulting from there being more of us with less land available, we will have to forego what we know is physically ideal from the mental health and sociologic health points and that we may be able to minimize ill effects of not being able to achieve the ideal in design and size, etc. by the introduction of skills in dealing with inter-human relationships. I think this may be one of the first recommendations which includes the skills of management of human inter-relationships as related to housing. The literature concentrates on solid things and does not say too much about the capacity of one human being to relate to another. I think those are capacities which we need to examine in relation to what we can do with people in housing as well as what we can build with housing.

Question from floor:

The 40 million dollars that you mentioned and the 10 million dollar increment each year? Occasionally I have had the responsibility of trying to justify some things to the Budget Bureau. Do you have any additional words as to how you arrived at this?

Dr. Smith:

Why, I think at this stage of the recommendation it is not appropriate to spell out in so many words how this is justified to the Congressional Appropriations Committee. That would certainly be something that I would see as coming at a step a little further down the road. I think a recommendation of this sort is simply to get the sense of the idea across and hopefully generate interest within concerned segments of the Administration, then carry it on to fulfillment.

Question from floor:

Moshe, did your committee by chance think of the possibility of suggesting that the safety study be made an integral component of the Operation Breakthrough project which is going to include studies of a total residential environmental system? Rather than picking up your 40 million dollars, going off into space somewhere and doing some independent research, it ought to be looked at in the light of the kind of housing that we might be building three or four years from now. I would suggest an amendment to include this potential in that recommendation.

Any discussion on that? Yes, Dr. Gaufin.

Dr. Gaufin:

I think, in checking, that this should be a separate component. The Breakthrough is really a take-off on existing housing technology, existing housing patterns, as I perceive it. In this workshop recommendation, I think we were talking and focusing on picking up a total new design concept, challenging old assumptions or even doing away with them. We said, let's look at what constitutes safety, rather than just what constitutes effective mass production of housing, and so on. It may well be that this should be a part of the same package, but I think the concept should be a separate end point because of the differences in assumptions on which the two programs are based.

Professor Shapiro called for a vote on the motion to accept the report and it was unanimous.

WORKSHOP NO. 2—CRITERIA FOR SPACE AND PRIVACY IN HOUSING

Co-chairmen: Mr. Ralph Johnson
Dean D. M. Wilner

Mr. Johnson:

We came to some conclusions that we really didn't want to, but to get on with it, I will read what we wrote down last night.

We said that according to present evidence, space and privacy have only dubious and perhaps undiscovered causal relationships to health or illness. Some concern was expressed that our measuring techniques may be too crude to find the relationship between space, privacy and health which many of us believe exists. But I think what we were saying to ourselves is that we know what we are finding is not true but we don't know how to prove that it isn't. Although, let me say for one outstanding economist, he didn't agree with us. He thought that we were finding out and we were proving that our results were, in fact, true.

For people who are high health risks, space and privacy do appear to have some relationship to illness and health. Crowding also appears to have a causal relationship to illness in societies having high incidences of infectious diseases. It was agreed that lack of space and privacy results in — and here you can see our bias shining through — discomfort, displeasure, disappointment and dissatisfaction, which we had to distinguish from mental illness. Nevertheless, we concluded that space is prized by individuals, up to a point at least, and is a value in and of itself.

There was extensive discussion on the subject of standards. Some suggested that in our advanced society housing codes may not be necessary for an industry as overregulated as housing. Enforcement of higher standards may result in higher costs for housing which, perhaps for low income families, are at the expense of sacrifices in such health-related benefits as medical care, education and diet; that housing code enforcement generates few, if any, health-related benefits; and that these codes are necessarily arbitrary by establishing finite numbers when they should be much more flexible.

While no formal vote was taken on the subject, during the discussion there seemed to be general agreement with the point of view of this statement.

There was extensive discussion on the question of allocation of limited public and private resources for such fundamentals as education, food, health care and poverty, as well as adequate space in housing. It is obvious that with existing limits on either national or personal resources, lesser resources are available for any one of these items when increased resources are allocated to any one of the other items. We are saying, in effect, individuals as well as society and the nation must make choices, some of which are not always easy. The group thought that the following statements from the position paper on the selected economic implications of housing codes generally represented their point of view—and I am quoting now for about a page!

"Comprehensive analyses of the direct and indirect effects of minimum standards in housing are sparse. Many well intentioned individuals are firmly convinced that development and enforcement of comprehensive minimum housing standards will directly produce major health benefits, especially for the poor. In challenging this premise, our purpose has been to broaden the discussion on the consequences of these standards and move away from narrow legalistic questions or issues revolving around the reasonableness of specific standards. We contend that minimum standards, outside a total effort to raise the quantity and quality of housing, will not achieve their objective of improving general health and safety. Undoubtedly, the removal or rehabilitation of poor quality housing should have a high priority, but this goal must be joint with a high level of new home construction. Blind application of the police power which merely reduces the housing supply, no matter how inadequate, or substantially raises housing costs is not likely to make significant contribution to good physical and mental health. Perhaps there exists a general awareness that minimum standards alone cannot meet these objectives and when promulgating them we are primarily satisfying middle-class sensitivities that something has been accomplished. This, however, would seem to be a weak reed on which to anchor comprehensive housing regulations."

Only a brief period of time was available for discussion on needed research subjects. For the most part, the research projects set forth below are the suggestions of individuals but without any substantial disagreement by the group."

Recommendations of Workshop No. 2:

We concluded that research should be conducted on:

1. *The health and/or illness relationship of space and privacy for high health risk populations.*

2. *The variety of ways in which interior and exterior space is used under different circumstances by different groups to find the most efficient ways of utilizing and providing space and evaluation thereof.*

3. *The meaning of privacy for various subpopulations in our society and on the extent and type of facilities necessary to provide privacy adequate to contribute to good health.*

4. *An evaluation of the effectiveness of various housing policies and programs in the localities, the states and the nation which aim at improving housing quality, health and safety and environmental quality.*

That is the end of the group's recommendations. This morning I thought that we really ought to add one more; This I must say is mine alone:

5. *The amount of space needed to be considered adequate.*

We really didn't come to any conclusions on that score. It seems to me that practically speaking, administrators of all types of public policy will be faced with some kind of a determination in this area and that we should take a look at this subject either affirming, denying or modifying the existing numbers that the American Public Health Association has developed.

Professor Grad:

I have a hunch that this workshop's report reflects a major degree of frustration with the way housing codes have operated in the past and I am perfectly willing to concede that housing code enforcement hasn't produced any miracles but, on the other hand, housing code enforcement hasn't ever really been tried, because we've never really had the means to do it properly. I think there is something to be said for maintaining standards rather than by being anti-standards or anti-minimum provisions of law—quite simply because we need them. I agree that in many instances these standards have been rigid and stupidly applied, but I don't think that this workshop recommendation ought to be read as proposing that we pour out the baby with the bath water. It is one thing to say that we need to adapt standards to produce what we want to accomplish, but it is another thing to say that we ought to do away with standards altogether. I would suggest that the building industry is not entirely an altruistic organization and if you do away with standards—minimum space standards, minimum standards of openable areas of windows or what have you, you are going to get minimum—minimum kind of construction. I would suggest that what ought to be done is the law ought to be used properly, the public health field and the housing field ought to learn how to use properly rather than turn thumbs down on minimum standards altogether.

Mr. Johnson:

Since I didn't engage in that discussion at all, would someone else from the Group 2 like to comment on this?

Professor Mittlebach:

Mr. Chairman, I think the group, in discussing the question of housing codes, considered in particular the issue that if housing codes are applied in the standard way, to the standing housing stock, and no provision is made for assistance to families and we do not also have a high volume of new construction, then the effects of the housing codes may be to place serious constraints and serious pressures on the families living in the housing where codes are being enforced. This is the issue. In another way, what we are saying is that housing codes are not, of course, a force in improving housing. However, this does not eliminate the fact that, in conjunction with those who administer large housing programs, those who write new and improved housing codes cannot aid in establishing criteria. This is the issue.

Mr. Johnson:

If I may, I would like to say that the gentleman's remarks are certainly germane. Perhaps you got the impression that we were recommending that the codes should be abandoned; that we should not have any standards. We differentiated between codes and standards. As a matter of fact, I think it was Mr. Brown who suggested that voluntary standards had worked in many areas and might be much more effective. What we did say was that some suggested that in our advanced society codes may not be necessary. We also, if I may make one other point, said that this was, in fact, demonstrated by the level of new construction. The quality of new housing is so much higher, so very much higher in all respects than the minimum standards contained in housing codes such as the APHA's that it just doesn't have any effect. You know, the average size of the new dwelling is three to four times as large as the minimum space standard in the APHA housing code.

Professor Grad:

I would like to comment that, of course, I agree that we don't solve housing problems by housing code enforcement alone, but on the other hand we do have a major responsibility to try and do the best we can to maintain our present housing inventory, quite simply because while the volume of building has increased it's not anywhere near what we need. My point is that it is obvious nowadays that housing code enforcement without subsidies to enable owners to comply is nonsense. What we need is subsidies plus enforcement. In other words, we need compliance programs which are not merely policing programs but which are also service programs. So the notion that we just enforce and put people out of their homes because they don't meet the standards doesn't make any sense whatever. But that is not what modern housing code compliance is all about. Modern housing code compliance deals with the creation and establishment of programs which, using the standards, cause municipal and state input and possibly, hopefully also federal input to help produce the desired task. If we do away with housing code standards altogether, and I'm not just talking about occupancy standards, you are going to find that you are going to go down the drain on sanitary facilities and on facilities generally for existing housing. You can certainly observe that, wherever the level of housing code enforcement has dropped to nothing at all, which has been the case in renewal areas. So, I would suggest that rather than making a recommendation that housing codes may not be necessary, that minimum standards may not be necessary, that on the contrary the workshop recommendation be amended to support the existence of standards but urge their reasonable application and urge that there be service programs provided for owners in meeting them.

Mr. Johnson:

We did not recommend that they go down, that they be abandoned. We were saying that there was discussion on this subject and I think that was by our economist friends who were kind of reminding us about some of the economic facts of life in their statements.

Dr. Parratt:

Mr. Chairman, I think that was in the form of a motion and I would like to second it because I think it makes sense to be added to your committee report.

Mr. Johnson:

I don't even know what it was.

Professsor Grad:

The motion was that the portion of your committee report that in any way suggested that standards be done away with be amended so as to provide that standards, that reasonable standards, continue to be maintained and that programs of housing code compliance be enhanced by making available subsidies which would enable not only enforcement but also the provision of services to bring out compliance.

Mr. Johnson:

Well, since we do not have any portion in our report which recommends doing away with standards, we don't really need that as I see it.

Professsor Grad:

Well, there certainly is a strong implication in the background.

Dr. Purdom:

Mr. Chairman, since Workshop 3 as you will see in a few moments also address themselves to the question of standards, perhaps Professor Grad's recommendation could wait until the end and then may be a point which would relate to both reports.

After further discussion a motion was made, seconded, and adopted to table the motion.

WORKSHOP NO. 3—PLANNING A HEALTHFUL RESIDENTIAL ENVIRONMENT

Co-chairmen: Professor P. W. Purdom
Professor Ira Robinson

Recommendation 1:

The World Health Organization's definition of health should be a goal in planning a healthful residential environment. The WHO definition states that: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

Discussion: Heinrich Blum and Frank Stead have proposed useful elaborations of the WHO definition. Blum suggests five goals of health: (a) prolongation of life, (b) minimization of disability, (c) promotion of self-fulfillment, (d) resistance to ill health and creation of reserve capacity, and (e) a high level of social well-being. Most of American society is concerned with this last goal. Stead suggests five health criteria for judging the environment: (a) insurance of survival, (b) prevention of disease, accidents, poisoning, etc., (c) promotion of efficiency and unusual performance, (d) provision of freedom from discomfort, and (e) provision of comfort, pleasure, joy and self-fulfillment. As society becomes more affluent, higher level criteria become more significant. Attainment of higher level criteria is not necessarily more costly to achieve than the lower levels.

Research Need: Research is needed to enable us to determine when a level of health related to one of the above goals or criteria has been attained and when an environment is unsatisfactory according to these goals and criteria.

Recommendation 2:

In order to achieve a "high level of social well-being" and "provide for comfort, pleasure, joy and self-fulfillment" and also insure basic levels of health we must produce environments which are subject to individual control and cease producing environments which are not subject to control by the inhabitants.

Discussion: The real issue which must be confronted in planning for self-fulfillment is: How do people feel (subjective) about the environment? The question must be asked: Are the inhabitants satisfied with their environment, irrespective of whether, in fact, the environment exists as it is perceived or not? To provide an environment which ensures self-fulfillment we must not only provide opportunity for choice but also a society which encourages the use of that opportunity. Public health responsibilty in planning the residential environment might be determined by the following criteria: If something in the environment prevents self-fulfillment and it can be demonstrated that a factor in the environment is a significant source of concern, then that environmental factor is a public health concern. Even though residents may express satisfaction with their environment, there will also be environmental stressors which are not identified by the resident's senses but are harmful to the levels of health discussed in Recommendation 1.

Research Need: We do not know what are the user preferences of individuals or groups concerning their residential environment. Reliable indications of user preferences can not be obtained from direct questioning. Attitudinal surveys can not be used to infer or project attitudes from one population to another or from one situational environment to another. Nor can attitudinal studies be used to study behavior, they are only suitable for studying the attitude of the surveyed population about the existing environment. Research is needed to investigate two approaches to determining user preferences: (1) urban simulation gaming laboratories, and (2) build into environmental planning the opportunity for users to plan or build their own evironment(s). Urban simulation gaming may not be able to define very detailed user preferences required for certain planning situations; to fill this void, research should be undertaken using anthropoligical and participant observer techniques to discover user preferences.

Recommendation 3:

Our population exists in differing environments and these environments provide different health levels. Because of these differences, standards must be adjusted to a situational approach. For segments of the population living in environments which only satisfy the lowest levels on these health scales, present minimum housing standards must be lowered to more realistic levels, and incremental standards and programs to raise these levels must be established. The population groups affected by lowering standards must be brought into the process of setting these lower standards so that the burden of revising the standards and making trade offs is theirs. For segments of the population living in environments which satisfy high levels of health, minimum housing codes restrict attainment of health goals and should be revised and stated as uncodified performance criteria or output measures in a revised series of documents which replace "Planning the Neighborhood." Such a revision of "Planning the Neighborhood" shall be based on present knwoledge and updated continuously as more research is conducted.

Discussion: There are at least two differences in our population which argue for a situational approach to standards: (1) cultural differences between resident populations, and (2) economic inequalities in buying power. Individual and group health is not furthered when a standard is set and it is stated that everyone has a right to the level promised by the standard, while the buying power of certain segments of the population delays for twenty to fifty years the time when they may reach that level. Not only does a single set of standards for everyone unduly raise the expectation of some, but since standards are derived from value statements as much as from technical findings, it also forces middle-class values upon people who may not share these values.

Criteria and standards can be thought of as lying along a continuum. Standards are measurable and are capable of being legally enforced; criteria are less measurable design information and may not be capable of being legally enforceable. Since low income people lack housing choice, codified minimum standards are needed to protect the minority from dishonesty and manipulation by the majority. Minimum standards should be stated as a range and related to cost feasibilities in order to facilitate making trade offs.

The revised "Planning the Neighborhood" or its sequel should state performance criteria (output measures) and provide examples of how the criteria can be implemented (realized). Use of performance criteria would make the revision applicable for both existing and new environments. The revised document should reflect positive values of health, allow for individual life styles and different environments, and accentuate the need for recognizing the inter-relationships between components of the total environment. The revised document should be continuously updated. Updating could be accomplished by setting up an information data bank which would consist of a typology of criteria about the relationships between people, spaces, and processes.

Research Need: A situational approach to setting standards needs to be developed. This approach should permit trade offs among standards while recognizing the public's unwillingness to allow the public servant to exercise discretion. Ways of building communications between residents and planners are needed so that the residents can effectively become participants in setting standards and criteria. Research is needed on how we can encourage incremental improvement of standards.

Some health and well-being problems result from behavior patterns of the users of an environment; there are both service solutions and physical environmental solutions to such problems. Since urban simulation gaming explores the reasons why users make the choices they do, the technique should be investigated to see if it can provide guidelines on when to utilize environmental changes or changes in services as a solution to a problem.

Recommendation 4:

Environmental planners who are concerned with health in the residential environment should also become concerned with the larger ecological issues of a megalopolis and their impact on the residential environment. Such a concern would necessitate development of new health requirements for planning the residential environment and should be incorporated in a new publication entitled "Planning for the Megalopolis From the Health Standpoint."

Discussion: This publication should recognize the impact of the larger urban environment on the neighborhood residential environment. It would include discussion of such issues as maximum population size in a megalopolis and its impact on health in the residential environment. An objective of such a publication would be to provide a health input into the formulation of the National Urbanization Policy. Such a publication is suggested in addition to, not as an alternative for, a revised "Planning the Neighborhood."

Recommendation 5:

A number of institutional constraints must be recognized and strategies designed to cope with them if an effective attack is to be mounted on health and well-being problems in the residential environment.

Discussion: The following institutional constraints exist:

(a) Environmental standards are used by government agencies and private lending institutions as criteria for granting or loaning money. If the concept of standards and/or the standards themselves are changed, these groups must be induced, perhaps through involvement in standard setting, to adopt and utilize the changes.

(b) Regulatory discretion in the administration of standards is inhibited by inadequate expert manpower in government agencies and prohibited by existing legislation and judicial rulings.

(c) Existing state and federal programs limit the use of public funds for mental health related facilities in the neighborhood. Existing government programs place a higher priority on funding neighborhood improvements which may have more of an impact on physiologic health than on psychologic health and well-being.

(d) Unrealistic codes are perpetuated because regulatory agencies fear the public's reaction to a lowering of housing standards to conform more closely to available resource levels. This reluctance to lower standards not only raises expectations unduly, but it also discriminates against transitory structures.

(e) Adherence by public and government agencies to the concept of neighborhood schools impinges upon the achievement of such health goals as self-fulfillment and a high level of social well-being.

(f) We do not have a national policy on integration or its alternatives. As a consequence, there is no means of coordinating all government policies so that they reinforce each other in their impact on the residential environment. At present strong counter trends exist in this country. One trend would review the ghetto for the ghetto dweller; the other trend would break up the ghetto to encourage integration.

(g) Existing zoning and other land use controls which isolate the home from the place of work raise ecological issues in the metropolitan environment, affect health by delimiting job opportunity (self-fulfillment) and in other ways impinge upon the well-being of the commuter and his family.

(h) Federal and state resources are allocated through existing programs which influence residential growth and population and its distribution in countless unplanned ways.

(i) The present law of landlord and tenant is inimical to the maintenance of health in the residential environment. Leases of dwelling space do not have the characteristics of ordinary contracts; a tenant's covenant to pay rent is independent of the landlord's obligation to maintain decent housing conditions.

(j) The present fragmentation of local governments in urban areas inhibits a coordinated attack on environmental problems which disregard the jurisdiction of any one government.

Dr. Mitchell:

I was disturbed by the one part of your initial summary where you were substituting what I thought were vague subjective criteria for the sense of well-being in the neighborhood which may appear different to someone in Orange County, California, than it does to Orange County, Florida. In effect, it seems to be or could be construed as a defense of present segregation policies in the South as in other cities and I would like to see in the rewording that such connotation does not come through and that it cannot be used for that purpose.

Dr. Robinson:

How did you draw that inference, Dr. Mitchell?

Dr. Mitchell:

Well, if you want, many people in the South as well as in the North will look at the neighborhood in terms of what makes for a "good neighborhood" and what makes for "stress." We have had some difficulty lately in Southern South Carolina from which it would appear that some people think that this is a stressful situation to have integration. I think that what you are implying in your early statements was a defense of segregation. It could be used for that purpose.

Professor Grad:

I am moving to remove any implication from the workshop's report that this group is in favor of doing away with minimum standards or with codes and that as it stands there be recognition of the fact that code enforcement has a valuable place in this world; that code enforcement and code compliance programs are necessary, but in order for them to make a contribution, some people need governmental subsidies so that compliance with code standards may be accomplished; that the law be used to provide a means whereby code standards can reflect what we really want to do; and that they have the flexibility and the adaptability that we all seek.

Mr. Senn:

We ask whether Mr. Salvato would like to second this.

Mr. Salvato:

Second.

Professor Parisot:

I would remind the good Dr. that he is preempting some of the report of Section 8 of which he and I were both members, where we do deal with this matter of value and the extent of housing codes.

Professor Grad:

The only reason I am making this point is so that there can be no conflict between the report of Workshop 2 and Workshop 8. In other words, if Workshop 8's recommendation is adopted, there will be an obvious conflict between it and the recommendation of Workshop 2 and my motion is made for the purpose of removing this possible conflict.

Comment from floor:

Having participated in Workshop 2, I am not aware of any direct recommendation in our workshop report that would give rise to the concern that Frank Grad expresses. On the other hand, it seems to me entirely appropriate for expressions to be made within the context of this overall Conference that challenge, perhaps, the desirability of continuing with the kinds of things that we've done with code enforcement and code development that we have in the past. And this is the only relationship that comments in our Workshop Number 2 session have in relation to this matter under discussion.

Mr. Senn:

Well, it seems to me that what we will have will be a proceedings which contain all of the comments of the various workshop groups pointing to the hazard of certain types of codes. What we are now proposing is that it is not the consensus of the Conference that, in our concern for unreasonable codes, we should wipe them all out. I think this is what I understand the discussion is all about. I think the expressed concerns on both sides will appear in the proceedings. I wonder if you would be ready for the question.

Professor Burns:

I urge you vote down Professor Grad's motion. I have carefully reviewed the document which this workshop came up with and I find no reference whatsoever to the abolition of codes. On the other hand, if we support Professor Grad's motion, we would be, in effect, saying that we definitely do want to support codes and this is not at all our recommendation. Rather, we want to leave the option open of considering codes of various types or the extremes of either abandonment or strengthening of codes. Furthermore, I see no necessity of homogenizing the recommendations of the various groups. Hence, I urge you to vote down this recommendation, particularly in light of the fact that we have yet to consider the recommendation of Workshop Number 8.

Mr. Senn:

Without editorial comment, could we say we have had expressons "for" and "against." Could we take a vote at this time? No? All right. What do you propose—more discussion?

Mr. Senn:

Frank Jacocks is suggesting that we again delay action and vote on this until we have heard from all eight reports.

Professor Grad:

My motion was in favor of reasonable use of codes and in favor of code compliance through subsidies for code enforcement to enable householders to meet the requirements of codes by providing not only the policing efforts of government but also subsidies from government. My motion was directed to avoid any conflict between the report of Workshop 8 of which I know the contents and the implications of the report of Workshop 2, which seems to downgrade the necessity for codes.

Mr. Senn:

Yes, sir. Now, do we want to have a show of hands? All in favor, please raise your hands. Let us see how many are against and then we will see if we have to count. How many are against? This is no. Now let's see aye again. O.K. It's a draw unless you want to call for a written ballot.

Mr. Fike:

I make a motion that it be tabled.

Mr. Senn:

There is a motion that it be tabled. It has been seconded. Let us call for the question. All in favor of tabling the motion say aye. And no? The ayes have it and the motion is tabled.

WORKSHOP NO. 4—NEW TOWNS AND PLANNED UNIT DEVELOPMENTS, INCLUDING RETIREMENT AND MOBILE HOME COMMUNITIES

Co-chairmen: Mr. Hugh Mields
William L. C. Wheaton, Ph.D.

Dr. Wheaton:

I will not attempt to summarize the process of discussion that our workshop went through and, therefore, the conclusions may seem somewhat more abrupt than those of the preceding committees. But they follow the pattern of Workshops No. 1 and 2 in coming out with specific recommendations which, since I am going to ask you to approve them, I must read. There are five, each has some subparts.

The first is the New City Programs in Urban Development Policy. New communities are now required in almost all countries to accomodate the growth of urban populations, to meet the economic, social, health and environmental needs of the population and to permit the application of new technologies which make possible a better and more healthy life.

New communities may be developed as satellite cities within metropolitan areas, as new cities in megalapolitan regions, cities which are developed to exploit new resources or the expansion of existing cities or towns.

As a part of its long term development policy, the United States will require a large new cities program to accommodate migrants to metropolitan areas, people moving from densely populated areas and natural increase in the population. One responsible group has called for a hundred new cities in the next 20 years to accommodate 20% of our urban growth.

2. Types of New Cities—To accommodate the diverse needs, tastes and service requirements of the population and to provide an opportunity at which people can make choices regarding their housing, employment and services, the new city program must provide for quite varied communities, including ones of high, low and mixed densities in satellite and wholly new locations, with economies based upon manufacturing or services, with very wide ranges of dwelling types, tenures and service patterns.

Each such community should serve a wide range of populations. It should include some heterogeneity as measured by age, family size, income, occupation and ethnic group or social class. It must have a range of employment opportunities approximating in size the resident labor force, and a full compliment of public and private services such as schools, hospitals and other health services, churches, recreational facilities, stores and retail and professional services.

New town planning and building in major

metropolitan areas should include efforts to help relieve the full range of problems now plaguing the Nation's central cities. Linkages and continuing relationships must be developed with central city renewal relocation and housing programs. In addition, transportation facilities tieing the new and the old should be provided to assure access to educational, cultural and job opportunities produced by new town development.

3. Social Experiments. Each such community should be viewed as a large scale social experiment to achieve a more healthy pattern of life and freedom of choice for the varying groups of the American population.

Within each such community there should be subexperiments, i.e. with governmental organization, health services, educational services, recreational facilities, neighborhood pattern, dwelling types and dwelling mix, neighborhood and community social mixture and the scale and grain of mixture. All components of the environment should be treated as an interrelated system.

In some communities a large share of the costs of experimentation should be borne by the Federal government as with NASA and AEC programs so as to permit a wide range of innovation without normal financial constraints. In every community there should be one or more services or features which are subsidized or relieved of normal restraints for testing purposes.

Some of the new communities should be constraint free. There should be in these a systematic effort to develop new sets of local government or regulatory institutions which test new modes of community organization, service, regulation or control.

4. Planning Processes. The planning process for new towns must provide for the serious involvement of all those peoples, private and public organizations, whose future will be affected by the building of the new community.

Planning must provide for continuing growth and change, not for a static city. Major regional efforts must be undertaken to coordinate the planning and installation of industrial service and housing facilities to secure their simultaneous availability to the population.

5. Research Needs. For these purposes there must be the following types of research among others:

Overall monitoring and description of the community from inception to five years after completion, including such elements as public services, public utilization of facilities, social and demographic change and health information.

Analysis of the planning and development decision processes, including decisions regarding community organizations, service levels and local government.

Selective in depth studies of particular plans, facilities or services to measure their impact upon the community.

Overall periodic surveys to develop and utilize measures of comparative satisfaction, health or efficiency.

A very broad range of comparative studies should include international studies, studies of various cultures, studies of whole communities, sectors, including comparative studies of the health of residents of model neighborhoods in existing cities and in new communities. One percent of the capital resources of the program should be allocated for such research.

Research should be undertaken to investigate and assess the value of innovative physical and spatial configurations to be used in new towns. Attempts should be made to evaluate the livability and desirability of such forms of development as self-contained communities in megastructures or oministructures, modular housing communities of high or low rise and of carying density and configuration, mobile home communities and unique physical or spatial configurations of other components of the community such as transportation modes, town centers and others.

I move the adoption of this committee report.

Mr. Senn:
Might we ask for "acceptance" instead of "adoption" of this recommendation, as it was suggested before?

Dr. Wheaton:
Acceptance.
Unanimously accepted.

WORKSHOP NO. 5—METHODOLOGIES FOR APPRAISAL OF THE QUALITY OF HOUSING AND ITS ENVIRONMENTS

Co-Chairmen: Mr. Al Brunwasser
Mr. Bailus Walker

Mr. Brunwasser:
The group set forth three particular areas which we were hopeful to examine:

1. The state of the art;
2. The gaps; and
3. Possible needs and areas that may lend themselves to research.

The committee concluded that housing appraisal should be construed to mean a method or methods of determining the state or condition of housing and the immediate environs.

Appraisal methods examined are divided into three broad types with different techniques and objectives:

1. Establishing a national inventory of characteristics of the residential environment.

2. A method that produces the necessary data to direct or redirect resources designed to improve the residential environment and which will satisfy the requirements for governmental assistance programs.

3. A method that will provide data which have as their long range goal the establishment of the relationship between residential environmental characteristics and the human response.

The undertakings of such appraisal must be an ongoing process to record related changes in human and residential environmental characteristics which can be related.

Now, for the techniques—the committee reviewed both current and proposed techniques. We were able to have with us a representative from the Bureau of the Census who participated in the discussion. The group expressed their position on the technique of the United States Bureau of the Census in this manner: that the U. S. Census supplies some valuable data for planning for a limited period following the availability of the data. However, for long range planning, more specific and comprehensive data should be made available.

We fully appreciate the problems faced by Bureau of the Census in their attempt to satisfy the needs of diverse sets of users. We strongly recommend that the APHA assume a stronger role in relating the needs of users and the activities of the suppliers of housing environmental data. At the present time we have the capability to specify the data inputs to a national inventory of housing characteristics. This is through the efforts of the U. S. Bureau of the Census.

However, this group strongly recommends that research be undertaken to identify meaningful data inputs to a national inventory relating to characteristics of the total residential environment, not limited to housing.

It is considered that all data collected in this context should be objective in a sense that they should relate primarily to readily measurable attributes of housing and its environment. The relation of these data to minimum standards or some other criteria should be a second stage process. In the deliberations which preceded this particular workshop's concerns, it appeared to be certainly apropos that the appraisal methodologies be capable of utilizing the recommendations made by Workshops 2, 3, and 4 and, I am sure, that the following recommendation will also have a bearing upon the appraisal methodology.

In this manner cross national comparisons can be made in terms of any subsequently imposed criteria.

The second method that the workshop considered was the rapid appraisal techniques. These methods are used for appraising the physical environment. Major considerations in development of existing procedures have been to keep the cost per unit surveyed as low as possible, yet produce consistent and reliable data.

Present rapid surveys comprise the ground and aerial photographic techniques and it is clearly appropriate for me at this time to point out that the members of the group for Northwestern University who have been involved with the aerial appraisal methodology, were very anxious that this body, APHA and governmental agencies look at this particular technique very closely. It is being correlated with other survey methods. It is very closely related to the efforts of NASA and some of the changes in the NASA policies and programs certainly will have a bearing on the future development of this particular technique as a rapid appraisal method.

In the rapid survey technique the basic issue is the definition of the minimum amount of data required for delineation of areas requiring intensive examination. At the aggregate level appropriate to this problem there are many variables incorporated into the existing surveys. We feel there is some strong correlation and evidence exists to suggest that problem area delineation can be achieved with only a small number of environmental variables, utilizing both the aerial and the rapid ground techniques. Preliminary analysis indicates that photographic procedures are compatible with ground survey results at the neighborhood level.

Now for the recommendations of this particular workshop:

SPECIFIC RECOMMENDATIONS

Research, development, demonstration and evaluation in a number of areas is required. We strongly recommend that APHA develop a mutual program with HEW, HUD, Department of Commerce, NASA, Department of Transportation and related agencies to fund developments in the following areas:

NOTE: It would be advisable that wherever research is used in this report that it be spelled out as follows: research, development, demonstration and evaluation.

I. National Level

1. The funding of research to develop sampling methods to update national inventories in intercensal years. A report containing specific proposals should be completed by 1972.
2. The definition of data inputs relative to characteristics of the residential environment for inclusion in national inventories. Particular attention should be focused on the meaningfulness of these data for national policy-making.
3. Local areas generate large amounts of data on housing and its environment in the course of their day-to-day activities. Frequently these data are not usable as inputs to existing national programs. We recommend that research be undertaken to determine: 1) those elements of local data sets that are compatible in terms of subject matter and application, and 2) develop national programs that could make use of data which are already on file at the local level.

II. Individual City Rapid Survey Techniques

1. Evaluation of relative efficacy of ground and aerial survey techniques for rapid delineation of areas requiring more intensive study.

   It is strongly recommended that this evaluation be funded as soon as possible by Federal agencies so that a comparative evaluation of the various techniques can be completed by 1973.

2. A program of *applied* research, directed toward development of objective (reproducible) measures of housing-environment characteristics, should be initiated immediately. These measures should be independent of minimum standard or other criteria.
3. A basic program operated through the Public Health Service should be initiated immediately to define standards to be applied to these objective data such as to yield meaningful statements regarding the quality of the residential environment.
4. Current Federally-developed methods (PHS NEEDS) for application in each local area merits immediate initiation and field application to further validate the initial promising start.

III. Correlational Studies

1. Development of improved methods of continuous updating of housing-environment characteristics in a manner compatible with the structure of data files relating to health. Strong attempts should be made to integrate this research with ongoing research on information systems undertaken by other public and private agencies.
2. A mechanism should be developed for continuing modification of data inputs to appraisal surveys based upon developments in theory relating to the relationships between residential environment attributes and patterns of human response.

Finally, given that the recommendations of the other workshops are all relevant to the data collection and appraisal process, we strongly recommend that the appraisal study group be reconvened to consider the recommendations of other workshop groups. Where possible, their findings should be used as a basis for further recommendations regarding inputs to future data files relating to characteristics of housing and its environment.

This concludes the recommendations and the report.

As the co-chairman of the workshop, I move for the acceptance of these recommendations. (Seconded.)

Mr. Senn:

Yes. Thank you very much.

All in favor.

Report unanimously accepted.

WORKSHOP NO. 6—DESIGN AND MAINTENANCE OF SAFE HOUSING AND THE RESIDENTIAL ENVIRONMENT

Co-chairmen: Mr. Hans Grigo
Raymond Neutra, M.D.

Dr. Neutra:

In focusing our attention on the residential environment rather than on housing, we are recognizing the economic fact that the unit of design is rapidly becoming the neighborhood and its attendant facilities. In this era of industrialized housing and new towns, the home, the neighborhood, and even the small town have become a single product. We recommend that we do our research, devise our applications, and conduct our evaluations with this new product as the unit of interest.

We have organized our report under three headings: research, application, and evaluation, with the realization that we must continue gathering information on the cause of accidents but to benefit the consumer we must convince the government and private industry to apply this information. And finally, we must have an ongoing program to evaluate the success of safety-designed innovations to make sure that we have achieved the maximum safety wth the least possible cost.

RESEARCH

1. We recommend that funds be appropriated to the PHS in the next two years for research to identify organizations in the government and in the private sector who could apply our present and future accident prevention information. PHS must pay special attention to the form in which accident information is packaged so that is relevant for use.

2. We recommend that the present multilevel data collection of the PHS be continued and expanded.

a. In particular, death certificate analysis should be continued.

b. Data from the National Health Survey within the next two years should include agent of the accident, location of the accident in the neighborhood, days of disability, and all economic losses.

c. In the next year, funds should be made available to PHS so that the new town research now being conducted can be expanded and perhaps the ten Operation Breakthrough sites could be included in surveillance on a regular basis of accidents treated in medical facilities.

d. The acquisition of comprehensive injury morbidity data from emergency facilities across the country should be continued and mobile home accidents should be classified as such in that surveillance.

e. The indepth epidemiological investigation of accident cases being conducted by the PHS should be continued.

3. We suggest the PHS recognize that industrialized houses are products and that the scope of the indepth study of accidents be enlarged to study items in home design, as well as the design of smaller consumer products.

4. We endorse the new system of fire reporting devised by the National Fire Protection Association and recommend that serious consideration be given to finding funds to gather fire information throughout the Nation. The findings should be made available to code and regulatory groups for help in upgrading fire protection and life safety provisions of codes pertaining to housing.

5. Despite the growth of industrialized housing and new town development, we recognize that half of our present housing inventory was built before 1939. Projections suggest that they will still comprise one third of the inventory by the year 2000. We should continue gathering information on accidents in the existing environment so it will be available for guidance in maintenance and renewal activities.

6. We recommend that HEW, HUD and the National Bureau of Standards begin to initiate a joint program to foster research and eventual construction of model demonstration safety dwellings and neighborhoods. Such prototypes could be part of the next phase of Operation Breakthrough. We feel that the APHA, the AMA, the AIA, the National Safety Councl and the various safety organizations in the private sector should be mobilized to give full support to this concept.

APPLICATION

Until the present, housing codes have fostered safety almost exclusively in the areas of structural soundness and resistance to fire. We would like to point out that industrialized housing and new town planning provide the opportunity of developing designs which lower the risk of a variety of accidents and which minimize the degree of injury once an accident has occurred. Industrialized housing and new town planning also allows us to provide a prosthetic environment for those who have been temporarily and permanently disabled by accidents.

1. We recommend that HEW, HUD, and the National Bureau of Standards intensify their efforts for stimulating the development of performance criteria for safe industrialized housing both on the basis of present knowledge and on the basis of continuing research and evaluation.

2. In addition to onsite inspection, we recommend that industrialized housing assemblies be inspected according to these standards in the factory and that a nationwide uniform performance standard be developed.

3. We recommend that HUD consider, if they have not already done so, the concept of a several year warrantee on industrialized housing, perhaps with required measures of preventive maintenance, as is now the case in automobile warrantees. The maintenance schedule should be included in an owners' manual called for below.

4. We recommend that HUD and HEW explore the possibility of funding research in the development of a home owners' manual for industrialized housing. The manual should assure safe operation and maintenance of the home. We recognize that present day operation manuals are rarely read and that modern teaching and marketing techniques would be needed to put this information across.

5. In regard to conventional housing the committee noted the need for inservice training for building inspectors and fire inspectors across the nation.

6. Before more definitive research is carried out, the PHS should identify the existing sources for safety information in this country. It should identify the governmental and private organizations which could use safety information and the form in which that information needs to be presented.

7. The committee stresses the fact that fruitful communication can only take place on a creative face to face basis and that the exchange of technical reports and governmental memoranda do not ensure effective communication nor provide the necessary friendly give and take.

EVALUATION

1. In regard to the present Operation Breakthrough projects, the committee applauds the opportunity for taking a fresh look at safety in the house and neighborhood and exploring new ways of fostering safety as well as new ways of defining and enforcing safety standards. We suggest that HEW, HUD, NBS, National Academies of Sciences and Engineering and interested organizations in the private sector cooperate in devising the protocol for immediate and long-term evaluation of the safety of the ten Breakthrough projects. This cooperation would bear several fruits:

a. It would provide an opportunity for developing safety inspection methodologies for industrialized housing.

b. It would provide the opportunity for exchange of expertise among the personnel of the several agencies.

c. It would provide ideas for subsequent performance standards and design innovations for the next phase of Operation Breakthrough.

2. In regard to the next phase of Operation Breakthrough, the committee recommends that the government foster the development of performance safety standards and methodologies for determining the compliance with these performance criteria. These criteria should guard designers and should be used for eventual evaluation of the building systems themselves. A long-term evaluation should be carried out to give us information on the effectiveness of the new housing and neighborhood design innovations in preventing accidents.

That completes the report and we urge its acceptance.

Comment from the floor: I notice that you have suggested or recommended that accidents that happen in mobile homes be so identified. I am wondering why this recommendation was made, whether you think mobile homes are more accident-prone. If that is not the case, it seems a little discriminatory. But even if it is the case, it seems we should go further in trying to relate the accidents to the features of mobile homes that bring about the additional accidents. I question why you seek to identify that particular type of accident.

Dr. Neutra:

I think your point is good. No, there is no evidence to show that mobile homes are more hazardous than conventional housing. We should point out that we are interested in the features of the mobile home which do contribute to accidents and injuries. This type housing was specifically mentioned because it is a product which is produced at the rate of 400,000 per year and in the present reporting system it is not identified separately. And it is just the first of a number of such products that will be mass-produced in the coming years.

From the floor:

On this last point, I don't wish to make any discriminatory remarks toward the mobile homes but there is evidence that the carbon monoxide levels in these homes is high. This could be a contributing factor to such accidents and I recommend very strongly that a close scrutiny of the sources of this carbon monoxide in these mobile homes be examined carefully.

The recommendation was accepted as an amendment and the report was accepted.

WORKSHOP NO. 7—NOISE, THERMAL CONTROL, AND LIGHTING OF THE HOME

Co-chairmen: Professor Preston E. McNall
Professor Kenneth C. Stewart

Professor Stewart:

Since acoustic environmental control is my bag, I'd better be absolutely sure that I have optimized the conditions here so that each one of you hears every single word I have to say, otherwise you certainly will never accept the recommendations of this workshop. These are our recommendations:

1. A fundamental consensus within the noise workshop concerning health-related factors with respect to noise in the environment was that *the growth of sound pressure levels in the environment must be halted now; and that every reasonable effort to reduce current environmental sound pressure should begin immediately.*

The value to which environmental sound pressure level can be lowered will probably depend upon how much health status the population is willing to surrender in relation to direct costs necessary to effect controls.

As a practical matter, it is recognized that sound pressure levels cannot be reduced to those established by nature herself. It's a little too late for that. In terms of technology, however, nearly any acoustic stimulus can be reduced to levels below those which might conceivably influence the health and well-being of the most sensitive individual. Clearly, such level of control would probably be prohibitively expensive.

A central problem, therefore, is to obtain defining criteria which establishes the health status in relation to acoustic stimuli. We have these defining criteria in hardly any area at this time except perhaps for the restricted, limited, industrial exposures where everything is nice and pat and real clean in terms of the overwhelming acoustic insults. Research in this area will require the broadest prospective and will be complicated by many factors on both the physical measurements and the human side.

2. *In relation to physical measurements, it is suggested that the dbA sound pressure level with additive factors to introduce an amplitude distribution statistic, is a reasonable starting point. More sophisticated techniques do not, at this time, appear to provide additional overwhelming pertinent data.*

3. *On the other hand, population studies will require exacting and rigorously conducted experimental design to determine mean or median response criteria concerned with questions asked about acoustic privacy, nuisances, irritability, and sleep loss.*

A serious deficiency in such studies is the fact that non-acoustic factors often influence a particular human response to an intruding acoustic stimulus.

4. Research needs in other areas may be listed without extensive comments:

A. *Research to establish performance*

criteria with respect to acoustic control in housing.

B. *Research to define user needs.*

C. *Research to develop new acoustical materials both for sound absorption and for sound transmission loss.*

D. *Produce certification, including building components and equipment used in homes. A particular case in point contains the variation associated with the sound transmission classification of home building partitions.*

5. *It is essential to communicate to manufacturers the needs of the user with respect to the sound power output of the home equipment, including engineering noise controls to provide maximum health protection to the consumer.*

6. *The magnitude of the existing noise problem requires the maximum utilization of human resources to bring about the effective solutions to the problems. Intergovernmental co-ordination and cooperation in the public sector, as well as within the private sector, will clearly be required. In this regard, personnel in health law and in plannng should be deeply involved in implementing criteria developed in acoustic control research.*

7. *Lastly, the goals set forth in this summary of workshop recommendations strongly suggests the immediate need for professionals trained in the broadest aspects of acoustical environmental control.*

This concludes the report and recommendations from the noise workshop. I would ask for acceptance of the report.

Seconded and unanimously accepted.

Mr. Senn:

Thank you, very much. Maybe you'd better stay there in case, in the final discussion of workshop session 7, there are further questions.

We would like to call now for the co-chairman for ventilation, air conditioning and related factors, Professor Preston McNall, head of the Department of Mechanical Engineering, and Associate Director of the Institute for Environmental Research, Kansas State University.

Professor McNall:

First, acoustic control is not enhanced by open windows and doors. I think that should be said.

We have several other items—ventilation, thermal, and illumination to discuss, and we will take them in that order.

We decided that ventilation requirements are for people and not for spaces. So, somehow in the future, we ought to relate the ventilation requirements to the number of people and produce a rating that certain residential areas should have. This number should be based upon some kind of expected maximum occupancy that will happen rather frequently, such as a party or social gathering. That number can better be set by others rather than by ourselves. So we are talking about the number of cubic feet per minute per person in rating of an apartment, rather than so much ventilation per square foot of floor area, since to provide standards which allow innovative design, latitude should be allowed in terms of spatial considerations.

In talking about contaminant free air, we mean air which is free of whatever contaminant we are talking about. We usually use ventilation to dilute the contaminants, such as carbon dioxide, for example, and carbon monoxide, body odor and the like. So that, if we are interested in carbon dioxide, we are interested in contaminant free air to be brought in for dilution.

8. *We feel from a health point of view, a minimum of 5 cubic feet per minute per person of contaminant free air which has the percentage of oxygen concentration found in outdoor air should be provided for health purposes to prevent a carbon dioxide buildup in the space, this amount producing a safety factor of 2 or 3. We feel that this is an absolute minimum.*

However, we also find from documented research that Mr. Johnson's home building industry has already built some homes for which ordinary air leakage produces less than this 5 cubic feet of fresh, outside air per person per minute for significant percentages of the year.

Some form of mechanical ventilation is probably going to have to be required in the future.

The increased use of chemicals and pressurized propellant bombs in the home may result in present and future unknown health problems related to ventilation. Ten to 15 per cent of the general population is hypersensitive, or allergic perhaps, to many of the contaminants now found in residential air.

Outdoor air is often less than fresh air, so we would like to talk about outdoor air. Outdoor air will often need treatment, such as filtering, tempering and so on, prior to its use as ventilation air.

As many as 100 identifiable contaminants have been proved to exist in closed systems occupied by people; these were simulated space capsule environments. The health considerations of most of these are not too well known but should be studied.

Taking that information, then, we asked: "If we had to write standards today, what would we write?" This is somewhat different from what most of the presentations seem to be.

1. *In residential units, it is recommended that at least 10 cubic feet per minute per person of contaminant free air be introduced for both "well-being" and "health." The number of persons for which a residential unit is rated should be based upon its predicted capacity for periods of say, from 2 to 4 hours such as these social gatherings.*

And further, we propose some research needs because of the expected trends toward tighter construction, increased use of chemicals in the home and an expected increase in outdoor contamination in significant areas of the country.

2. *More research is needed to identify acceptable levels of contaminants, including synergistic effects of some of these contaminants, and identify these levels of contaminants and their effects upon health, both inside and outside of structures. In addition, the expected production levels of contaminants in the home per person per day or some other such measure should be measured.*

3. *Studies should be continued to determine existing air change rates of contemporary residential units.* In other words, what volume of ventilation do we now get with natural ventilation and modern construction, with windows closed?

Moving on to thermal control, again looking at what we think we know, there are four thermal variables: air temperature, mean radiant temperature, air velocity and air moisture content. These are presently related in the American Society of Health, Refrigerating and Air Conditioning Engineers Standard 55-66 titled "Conditions for Thermal Comfort." In most cases, the air velocity is below 45 to 50 feet per minute and mean radiant temperatures are within a few degrees of air temperature, so a thermal environmental description of air temperature and humidity alone can very often be meaningful.

4. *The thermal standard can then be summarized as calling for temperatures between 73 and 77° F. and relative humidities between 20 and 60 per cent for lightly clothed adults in sedentary activities in residences.*

It is further known that any conditions outside this range are considered stressful for the median person. Obviously, there are individual differences, but whether they are stressful outside that range, or whether they are a health hazard or health problem to such individuals is not necessarily known.

As temperatures increase above 80 degrees effective temperature (80° F. and 100% relative humidity at one end of the scale and, say, 90° F. and 20% relative humidity at the other end), additional deaths begin to occur in otherwise normal people when such average conditions exist for a few days. By additional deaths we mean those that are not made up by lower deaths in the future when the temperature returns to more normal ranges. There may be a few days in the year when these design conditions would not allow for strict maintenance of optimum temperatures. The Department of Defense limits established for air conditioning in government housing for service personnel should also be used. They provide for something in the order of 1,200 hours per year or more when the outside conditions are above 73° F. wetbulb temperature. There are, however, other requirements to establish this. In no case should the expected indoor temperature be allowed to exceed 80° F. effective daily average temperature for more than three consecutive days. This would be what we would consider a reasonable standard if we had to write it today.

Future research—including further epidemiological studies, are needed to quantify the health effects from heat from both direct and indirect responses. It appears that the direct effect of heat is heat stroke, but other indirect heat effects that are due to the stress are unidentified, as of now. Heat affects high density housing from both inside conditions and the outside microclimate and there needs to be further study to compare these measurements with weather data which is readily available. How much we increase the heat problem when we have high density housing needs more quantification. The effect of the thermal environment on the learning rate of children and adults and on productivity, as well as health and well-being, are also important factors for the nation's progress. Research studies to determine how air conditioning changes our living habits and our living quality is needed and if we were able to do this we could then consider how this might change the design of residential units for greater cost-effectiveness and increased living quality. The health and well-being effects of humidity should also be further studied.

This takes us into electromagnetic radiation, including illumination. In this area we have no participants that were particularly knowledgeable as experts. It was suggested that a minimum of ultraviolet radiation is necessary for health, but this is thought to be easily obtainable through normal outdoor exposure to the sun for a few minutes every few days or by other means. So we don't consider this a problem.

Illumination levels and patterns within residences are felt to be more a safety and performance problem rather than a health problem which is covered by other workshops. It was recognized that protection from X-rays, microwaves and so on needs further health study to assure that the residential unit shell provides proper attenuation from outside sources; that appliances must be designed to limit intensities of potentially harmful radiation.

That concludes the report and I would move for its acceptance.

(Seconded and unanimously accepted.)

Mr. Senn:

Well, thank you both. We have seen here many examples of how we are bridging gaps between different professional groups. We had the privilege of going to the American Society of Heating, Ventilating, and Air Conditioning Engineers Conference in Denver to hear Professor McNall's colleagues and others discuss how much they need input from health experts and we can see how much input we need from them and their professional backgrounds. The same is true in all of the other fields.

Mr. Lanoix:

Is there any reason why this committee has not discussed the question of aircraft noise in relation to the residential environment.

Professor Stewart:

The committee, in fact, discussed the problem of aircraft noise at length. But the aircraft noise is recognized as such a severe problem that within the framework of talking about the health and well-being of the population it seemed to be so thoroughly well recognized that we didn't elaborate upon the point. The other factor involved here is a comparison of human values. There appears to be need for measuring the response of a population to acoustic stimuli. This need was, for example, illustrated by high-rise apartments built near Kennedy International Airport under the glide path of incoming planes. The area, everyone agreed was associated with sound levels that were intolerable. But a speculative builder did build these three high-rise apartments in the area and there is a waiting line to rent these apartments. Why in the world would anybody rent these apartments? The answer is that the Blacks in the horrible rat-infested ghetto, the Puerto Ricans and other minority groups, who live in the New York City area, were able to move over into these relatively beautiful apartments. But the fact is that noise did not appear to deter them because they were concerned about other factors much more important to them than the noise. The epidemiological approach, directed toward gaining means and medians of response of the population, has to be well designed.

Dr. Pogrund:

I didn't attend the conference on noise and I am interested in a little expansion of the question raised by Mr. Lanoix. I just wonder in terms of going beyond the conventional aircraft and approaching the problem of the SST's, as an example, whether either there is attenuating material that can be produced to neutralize the homes to the deleterious effects of sonic booms, to which perhaps 60 million people in the United States will be exposed. I wonder if this particular group could propose a policy statement to the President of these United States, who will be in on the decision making process, as to whether to approve such projects or disapprove them, based upon the ability of materials to be used to attenuate such sounds?

Dr. Stewart:

I think this is an excellent suggestion and one which I certainly would support. We are already seeing, for example, essentially in the decision making process with respect to supporting the SST, that we in the acoustics field and in the health field are being shouted down by those who talk about the economies and the need to have an SST for all of the various reasons that we know about, such as competition in international trade. Perhaps there are even defense suggestions in terms of developing something like the supersonic transport. I am obviously being committed to concerns about the health and well-being of man and his environment, terribly concerned about what's going to happen to individuals because of land flyover of this SST, the wide path of sonic boom and the numbers of people who are going to be exposed. So I would say yes to your question with the agreement and acceptance of this on the part of Plenary Session.

Professor Mood:

Might we elaborate on this because he's talking about, apparently, individuals within the residential structure but we are addressing ourselves to housing and the environs and it seems to me as though we have got to be concerned when the individuals who are outside the structure and not subject to the protective shell of housing. So I think it's in this total concept of housing and the environment that we are concerned about the SST and sonic booms.

Professor Stewart:

There isn't any question about that.

Professor Wheaton:

Mr. Chairman, I move that the last three speakers be made a committee to draft a resolution in the name of this conference.

Adopted.

Mr. Senn:

We will assume this is a charge to you people to draft additional comments. I hate to cut this off—and let's give thanks to Joe Lanoix for not letting us overlook this. Unless we have the wrong impression because some people are willing to live under descending jet paths, let me cite that not unusual case where the Los Angeles City School Board has abandoned two multi-million dollar schools because of the noise and the fear of descending jets. Let me say when we conduct seminars at UCLA on the environment we try and talk about everything, but we can't get off the noise problem because that's the most important thing to people living near airports. They are planning a new jet airport out in Palmdale (north of Los Angeles) and the retired people who moved out there for peace and happiness are gravely concerned that instead of moving to the vacant desert miles away from the city's congestion, they'll be right in the middle of a noisy jet airport environment.

So, let us by all means consider this as a major problem and see if we can't come up with, not necessarily action policies based upon people accepting housing under jet approach, etc., but couldn't we have more research to measure these things and try to find out whether or not even those people living in the new apartments "on the dump" are really satisfied with their acoustical environment?

WORKSHOP NO. 8—LEGAL, ADMINISTRATIVE AND ECONOMIC ASPECTS OF HOUSING AND ITS ENVIRONMENT

Co-chairmen: Professor Eric Mood
Professor Spencer Parratt

Mr. Frank Jacocks: The report is divided into three parts: The first is based upon the recommendations which we felt we could write. They have been pretty well discussed many, many times and we did not feel that there was a need to have a great deal of background supporting the first 20 recommendations. There are later recommendations we felt may need a little explanation, so they will be the latter part of my presentation. But to start with, those which we felt we could read off very rapidly are:

1. *Determine sources of political support for housing codes enforcement, urban renewal programs, including grants and loans for persons whose dwellings have been taken by eminent domain.*
2. *Investigate the competitive roles of public and private housing for the economic disadvantaged.*
3. *Determine which standards are for the protection of those persons living within the vicinity of the dwelling as opposed to the protection of the occupant and his immediate family. Are there trade-offs? Are these trade-offs feasible and practicable?*
4. *Determine the efficiency of various administrative and financial techniques for obtaining housing code compliance.*
5. *Determine if housing code enforcement is satisfying people's desires and achieving measurable benefits.*
6. *Determine the feasibility of using a penalty point system to obtain a gradation of the degree of seriousness of non-compliance with housing code requirements, and of using the concept of basic deficiencies in what has been demonstrated to show cause and effect relationships.*
7. *Research in the following areas to identify salient characteristics for most productive housing programs for welfare recipients:*
   a. *Housing conditions of welfare recipients in urban and rural areas*
   b. *Obstacles preventing recipients from obtaining adequate housing*
   c. *The cost of housing available to recipients*
   d. *Means of protecting recipients from exorbitant charges for substandard dwellings*
   e. *An analysis of the housing market and the cost of and obstacles to the constructions or improvement of low-cost housing.*
8. *Determine the feasibility of obtaining housing code compliance through subsidies to low-income persons owning their own homes. Study the question of the practicability of housing code administration if subsidies are not available to low income homeowners.*
9. *Determine whether, and under what circumstances, home ownership provides the necessary incentive for proper main-*

tenance and the necessary desire to upgrade the house to meet housing code standards.

10. *Evaluate the effectiveness of neighborhood associations as potential adjuncts to official inspection resources.*

11. *Study the feasibility of mechanisms to consolidate the various subsidy and governmental systems into uniform and integrated entities to obtain greater efficiency and effectiveness of code compliances.*

12. *Undertake motivational research to develop attitudes to produce a greater sense of responsibility of tenants for the proper maintenance of housing.*

13. *Establish administrative guidelines which will permit modifications in the mechanisms and timing of compliance with customarily accepted minimum standards.*

14. *Determine methods for the modifications of standards so as to encourage technical innovations and cost reductions of code compliance.*

15. *Investigate methods to alleviate the impact of narrow jurisdictional lines such as city, town and village boundaries and metropolitan areas on both the construction of subsidized or low-cost housing and supportive services rendered by the governmental entities.*

16. *Determine the effects that tenant and owner subsidies would have in obtaining acceptable housing code compliance.*

With respect to environmental aspects of housing:

17. *Research present federal programs having residential environmental implications to determine whether actual or potential conflicts exist and, if so, how they may be resolved to realize fully the objectives.*

18. *Research to determine whether environmental code compliance contributes to the fulfillment of expectations for a more satisfying life for housing occupants.*

19. *Determine and evaluate which aspects of the environment will enhance and contribute to the effectiveness of housing maintenance and which aspects will render housing more acceptable and contribute most to its useful life.*

Now we list a few items about which we felt there should be some explanation:

20. *Building, housing and planning codes and code administration should recognize and support the changes of use and quality which occur to change the value of dwellings and local environments during their existence.* A house, if supported by its neighborhood, will generally last for many decades, often for a century or more and the individual plot of land and subdivision on which it stands may last even longer. In an urbanizing and rapidly changing context, where permanence and antiquity are of increasing rarity and value, and where solid waste pollution is escalating, it is most important that the design and construction of housing and the planning of local environments should maximize adaptability without unnecessary obsolescense. It is also most important, for as long as there are families who cannot afford new housing standards (at present over half the entire population of the United States) that the improvement and deterioration cycle which houses traditionally follow, should be modified by code legislation and administration. The great majority of low-income families depend on somewhat deteriorated older housing and those that can build new homes must often do so by incremental stages.

Any flattening out of the normal upgrading and downgrading cycle will put housing out of reach of the low-income families if codes are enforced uniformally at high standards. If lower codes are adopted, there is a danger that housing standards in general may fall to the lower level. We have incorporated a graph which will depict this particular condition that I have just described.

21. *This is a recommendation that building and housing codes and code administrations must be modified, where necessary, in order to enable owner-builders to construct standard houses incrementally. Each increment, however, should be of code standards for its designed purpose.* Code support and protection of this frequently practiced method would encourage many lower income families to make the necessary efforts to obtain improved housing and home ownership.

22. *Code administration for older houses must enable owners or occupiers to make the improvements to below standard and at levels which they can afford when correction of all violations is financially unfeasible.* Such guidelines and, *consequently*, viable building, housing and local planning codes can be formulated only after identification of significant necessary variations of housing and local environmental needs of such households which have different characteristics and settle in different urban or rural clusters. A research program should be designed which will provide the terminological and methodological framework for developing and supporting such special housing types or housing locations and environmental needs and demands of particular social groups. Thus, these smaller shorter-term studies would contribute to the major research efforts required in order to establish an adequate set of regional guidelines.

23. *A research program into these objectives would therefore have three components:*

    a. The development of a terminology or typology or a methodological framework;

    b. Investigations of particular housing applications and user needs, several of which are necessary in order to carry out (a) above; and

    c. The formulation of a set of regional guidelines for adaptation to particular localities.

II. *The development of environmental and housing guidelines for the national range of regional contexts and social sectors which require participant observation by qualified professionals.*

24. *Special, trained observers should live among the groups where housing needs must be identified and understood. They would, at the same time, study the ways and means of ensuring citizen participation in the formulation of local codes or adaptation of the regional guidelines.*

25. *The need for more effective standards and criteria for guidance in the development of mobile homes and other relatively low-cost modular housing parks and communities is becoming desperate.* Since these are usually outside of cities, the regulative system seems best researched on a county-based program. The emphasis is considered best focused upon environmental needs with careful consideration of populations involved. Special concern in mobile homes and modular housing clusters designed for the aged warrants immediate research to establish norms and effective administrative processes. Housing codes usually do not adequately cover mobile homes or temporary housing which is conspicuous on a number of university and college campuses. Emphasis should be focused upon development of norms and procedures through research in this matter.

26. *The need for guidelines relative to pedestrian oriented population clusters covering the element of the environment necessary for effective routine living and within convenient walking distance is becoming increasingly necessary as public transportation continues to decline. This problem is particularly associated with inner-city and, consequently, model-cities programs.* Development of guidelines and criteria would provide assistance also to planning boards in determining location of special facilities.

27. *The guidelines needed for location of special projects, either public or private,*

designed for aged must give careful consideration to provisions of environmental facilities and services within the range of their ability to reach. Since many, or most, such people are without automobiles, it is important that research findings be developed to support policy decisions in such situations.

28. *Even more restricted are the movements of the handicapped persons.*

It is recommended that cooperative research be undertaken relative to development of guidelines to aid in producing an effective location of housing relative to environmental resources especially suited to such persons. It will be noted that a serious problem is becoming more intense as urban renewal and other construction projects break up neighborhood shop-store-housing combinations which through the years provided employment and convenience to handicapped persons.

The need for specialized housing, located in proximity to centers for handicapped persons is serious and cooperative research to meet this need is recommended.

This concludes the report and I would request acceptance.

Seconded and unanimously accepted.

Mr. James Simpson for HUD:

We are approaching in HUD the $100 million dollar range in funding for R and D. Of course, a large part of that is going into Operation Breakthrough as you have already heard. You have heard about the 10 prototype sites on which we intend to build quite a number of units totalling 1,000 to 1500 units throughout the country. These are going to be built according to the best standards we know of at this time. They are going to be tested to be as certain as we can with knowledge available to us at this point in time that they are safe, that they are satisfactory, that they do meet sound standards of safety and health. This judgment being, of course, that they are going to be required to meet present building codes. As you have heard here today and yesterday and even the day before, many of us are not certain about the level of standards that we now have in building codes. Breakthrough is concerned with the total environment, not simply with the building technology, not simply with industrialized housing although a primary goal of Breakthrough is to increase the volume of new housing. This, we believe, can only be done by reaching a higher level of industrialization.

We are now in the process of planning details of the prototype sites. Many of the recommendations made here today would be appropriate if they could come to us promptly. We don't know what Charlie's plan is for getting the recommendations out to us. I hope they will come soon. I was particularly impressed with this, I believe it was the last report we had from Group 6, I think, the one that dealt with the safety and accidents. We are now in the process of planning data gathering schemes and it would be wise if we could get those recommendations.

Breakthrough also has a component which has not been discussed very extensively. The other day, Tuesday, Al Perry mentioned the Type A proposals and Type B and, I think, he mentioned that the Type B included those with more advanced technology, those that are not yet ready for production for the prototype studies, that is. We haven't yet announced the Type B but we are in the process of reviewing and evaluating it now.

HUD is also interested in rehabilitation. We have a project in rehabilitation going on which is less, or I should say, which is more quiet than Operation Breakthrough. We are endavoring to find some 10 to 15 cities in the country where we can undertake rehabilitation of a thousand units or more each. We will be interested in research on this subject. We are interested in standards, performance standards, we have already contracted with the Bureau of Standards and we will be contracting with others on this. One of your committees recommended that we develop performance standards of some sort and Reece Achenbach of the Bureau of Standards leaned over and he said, "I can't stand to put in any more overtime".

We are interested in this matter of standards. Some of us are inclined to feel that we are not at all sure that our present approach to codes and standards is what it should be.

We believe we would like to see some work done, some research undertaken which would perhaps see if there is another approach to codes and standards other than the ones we apparently know about.

We are interested in perhaps developing a rating system for the quality of housing and quality of the environment. I know APHA has a rating system that was developed many years ago. Perhaps something on this order might be thought about.

We are interested in accident studies. We have one study going on now, a small one in the field of accidents in the homes. Incidentally this indicates what we all knew, I guess, that a large number of accidents occur on stairs. What do we do about stairs to avoid the accidents?

I should say that perhaps unlike HEW which has an extensive grant program which was described to you, we simply do research by contract only. We tend to do most of the research in response to, or as a result of requests for work. We then publicly invite proposals from competent organizations. We do receive unsolicited proposals for research but we have very limited funds for this kind of work. Mainly the contracts go for work that we perceive needs to be done and for which we seek public proposals.

RECOMMENDATIONS OF CONFERENCE

1. The exceptional response to and high level of interest in the first APHA-PHS Invitational Conference on Health Research in Housing and Its Environment justify establishing a formal mechanism for continuing and expanding the APHA role in coordination and leadership of this type of professional stimulation.

2. A recommendation made by both American and foreign participants is that international collaboration, such as was begun at the Conference, should be established on a continuing and formal basis. There was much evidence of value from such exchange of knowledge and experience.

3. It is apparent that much can be gained by full collaboration with and support from the Department of Housing and Urban Development and all Federal agencies concerned with the residential environment, as well as with the Environmental Health Service of the Department of Health, Education, and Welfare.

4. The workshop groups have particular expertise in various special areas. These should be utilized by APHA as nuclei to make studies, provide data and advice and make evaluations of the various Federal programs and standards.

5. Planning should begin soon for a second vitational conference which would not only focus on health research but also involve the public and private sectors in broad considerations of socio-economic problems, including population distribution, ghetto segregation, housing for the poor, and other matters closely associated with needed upgrading of the residential environment.

6. To successfully plan and arrange such professional meetings requires several elements, including:

   A. Staffing and funding to secure data and basic information through special studies, evaluations and research, including adequate compensation for authors of position papers and working papers.

   B. Participation of professional environmental designers, scientists, and other practitioners with APHA in arranging for and guiding the various activities.

   C. Funding for a central coordinating and directing office.

   D. Funding and facilities to enable securing participants who can contribute knowledge and experience.

7. In view of the huge sums being spent on developing new and upgrading existing residential structures and areas, an adequate amount of scientific effort should be directed toward evaluating and developing goals, criteria, and programs which meet health needs. Such funding should be sought from the Environmental Health Service, the Department of Housing and Urban Development, and other public and private funding agencies with roles related to the health aspects of the residential environment.

8. Active effort should be immediately begun to implement the recommendations of the various workshop groups according to priorities established by the committee. Of special urgency are those programs which can produce vitally needed results in a relatively short, specific period.

9. At the same time, work should be started by conference attendees and others on important gaps in knowledge identified by the conference by research concerning specific relationships between the residential environment and health as broadly defined. It is urged that the secretaries of the DHEW and DHUD recognize the need for adequate funding of such research and collaborate in promoting its performance.

10. The conference expresses deep appreciation to the participating agencies and individuals, especially to the Environmental Health Service for its strong professional and financial support.

RECOMMENDATIONS
# of the
PROGRAM AREA COMMITTEE, AMERICAN PUBLIC HEALTH ASSOCIATION

1. In view of the 30,000 deaths and 16,000,000 injuries occurring yearly as a result of housing-related accidents, it is recommended that a national effort be initiated immediately to establish a safe housing and residential environment program to assure that safe housing will fulfill the needs and desires of the occupants and reduce the incidence of home accidents, particularly to the aged, the handicapped, and children.

2. Since present housing rehabilitation programs frequently require the dislocation of the occupants and cause rental rates for these dwelling units to be established beyond their financial resources, it is recommended that a program be initiated immediately to develop policy and technology for housing improvement of such nature, scope and characteristics as to permit rehabilitation of substandard and deteriorating dwelling units with minimal dislocation and so that after repair these units may be occupied by the same occupants and within their available financial resources. Such a program should utilize and apply some of the advanced technology developed from the space research effort and from the new methods of housing construction currently utilized by the mobile home industry.

3. It is recommended that ways be explored in which housing and its environment in urban areas can be so designed, constructed and maintained as to reduce stresses which lead to impaired mental health and social maladjustment.

4. It is recommended that the United States develop a program for the increased utilization of planned new towns as a means of relieving the stresses created by high-density populations in urban areas. This group agrees with the prestigious national committee which recommended the prompt creation of 100 new cities of 100,000 or more and 10 new cities of 1,000,000.

5. Inasmuch as the 1970 census will not contain sufficient data to enable governmental agencies to report national housing needs adequately for legislative and other purposes, it is recommended that the census be supplemented with health-related housing data by methodologies currently being refined by health agencies in a massive inter-agency effort, which are drawing upon extensive experience in measuring the quality of housing and its environment. These methodologies can and should be quickly expanded to national application.

6. It is recommended that fullest advantage be taken of the Federal program, "Operation Breakthrough," to arrive at better understanding of the ways in which housing affects health, resident satisfaction and a sense of community well-being. This will require the leadership of our best authorities in health and sociological sciences, professions, etc., in securing extensive participation by Federal, State and local agencies concerned with the community aspects of the projects, and by potential residents, in the planning, design, implementation and occupational phases of these projects. Such an approach will make possible the assessment of the benefits of planning a new community based on the desires of the potential occupants, rather than the traditional practice in which the planners alone have planned communities for residents whose needs and desires were not well understood.

Preceding page blank

7. It is recommended that a national policy be formulated immediately for stopping the increase in community noise and beginning a reduction of noise in urban areas. The policy should provide for maximum utilization of currently available technology for protecting the populations from those noises that cannot be eliminated at their source. Transportation has become a major source of community noise, ranging from unmuffled diesel trucks and motorcycles to the deafening roar of jet airplane takeoffs and the shrill noise of descending jets. Known technology should be applied to the fullest extent to eliminate motor vehicle noise, and massive effort should be applied to source reduction, planning and other elements necessary for solving the problem of jet aircraft noise in the vicinity of airports.

8. Based on the Conference's great concern for the potential health hazards caused by sonic booms, the Committee unanimously recommends that the President of the United States be requested to halt further progress on the SST program until there can be reasonable assurance the the health, safety and well-being of the people of the U.S. will not be adversely affected.

9. It is recommended that immediate efforts be made, including ascertainment of facts and revision of practices if necessary, to insure that housing code enforcement in urban areas satifies the desires and needs of the residents and brings about discernible benefits.

10. To assist in implementing the public policy statement of the American Public Health Association which calls for a massive attack by all concerned governmental agencies and the private sector to bring about an early realization of the national goal enunciated by Congress of "promoting and assuring the highest level of health attainable in an environment which contributes positively to healthful individual and family living," it is recommended that high priority be given for immediate study to develop the most feasible, effective and workable methods of mobilizing action, community participation and utilization of resources for attaining the stated goals. Special priority must be given to alleviating the grossly substandard and unhealthful conditions under which large numbers of welfare recipients and other poor families are currently living.

11. Since a disproportionate amount of health problems in the United States are concentrated in poverty areas where the residents' health, housing and other needs are neglected and they in effect have been disenfranchised in many important respects, it is recommended that the underlying social and economic causes be confronted realistically and immediate steps taken to provide access to all community resources and benefits on an equitable basis.

12. The Committee members were favorably impressed by the policies expounded by high-level representatives of the Departments of Health, Education, and Welfare, and Housing and Urban Development, who called for intensive and extensive collaboration for the purpose of assuring maximum input of health and human considerations in the nation's programs for correcting existing grossly substandard housing and residential environments, and for planning, developing and managing new developments, with particular reference to those intended to improve the quality of life for persons living in inner city poverty areas and other substandard and rural areas. The Committee pledged its resources to the implementing of such policies and programs, and expressed satisfaction that the Conference had unanimously resloved to make available the expertise of the various workshop groups and the Conference as a whole to assist in evaluating programs such as "Operation Breakthrough" from a health viewpoint, and in reviewing, planning and de-

veloping goals, criteria and programs directed toward meeting the urgent health needs of the nation's rapidly expanding population.

13. The committee expressed strong support for the recommendations of several workshop groups which advocated that human health and well-being be given greater emphasis and higher priority and the allocation of a considerably larger proportion of the national resources to establishing the most necessary means to achieve quality of housing and the residential environment through health-oriented research, study and evaluation of goals, objectives and programs in this field.

For example, the conference recognized the need and urged the Department of Housing and Urban Development to apply the Congressional mandate in Section 1011 of the Demonstration Cities and Metropolitan Development Act of 1966 for urban environmental studies to be carried out by working agreement with DHEW "to improve understanding of the environmental conditions necessary for the well-being of an urban society," especially as related to the residential environment.

CONFERENCE HIGHLIGHTS

SPEECHES AND DISCUSSION
FOREIGN PANEL COMMENT

THE NEW "HEALTH" GOALS IN HOUSING AND ITS ENVIRONMENT

Berwyn F. Mattison, M.D.: *

I would like to add my greetings and welcome and appreciation to all of the participating agencies which along with the Department of Health, Education, and Welfare made it possible for APHA to arrange this meeting.

The interest that the American Public Health Association has had in housing and in the relationship between housing and health is not new. I think most of you will date that interest from the days of C. E. A. Winslow but let me tell you that in 1873 in the first proceedings of our first meeting held in 1872, there was a paper on the hygiene of housing! So that the history of our interest is about equal to the longevity of the Association.

The report just about three decades ago put out by the C. E. A. Winslow committee on hygiene of housing called "Housing for Health" has been referred to by Mr. Senn. I would like to quote a couple of things from that which may sound familiar now thirty years later. The antiquity of the concern about housing as one of the factors of health was touched upon by that report as follows, "At Pompeii in the year 10 B.C. even for such a necessary work as a city wall, the city council paid compensation to owners of dwellings whose light was affected thereby." And, bringing it more up to date, in the reign of Queen Elizabeth two landlords who had (illegally) subdvided a tenement apartment in Hog Lane (I assume this is in London) for the use of poor tenants were fined and committed to Fleet Prison and then tenants permitted to remain without rent until they wished to move at which time the subdivided apartments would be destroyed. And I ask you how far we have advanced since then?

In that first report of "Housing for Health", a number of things were dealt with which we still think extremely important. For instance, it mentioned housing codes, surveys, slum clearance, health facilities in housing projects, the problems of recreation and use of living space, heating, lighting, noise control, and what they referred to as new technical possibilities in housing construction." This was thirty years ago.

Of particular interest in that volume were Winslow's reference to the housing effects on emotional health. There was a chapter on Family Life as the Basis for Home Planning. And there was a section on Social Effects of Good Housing.

So, even thirty years ago the consciousness of the relationship between the sociological factors and the physical factors in housing was being mentioned.

The appendix to that volume was, "The Basic Principles of Healthful Housing", which included specific requirements as fundamental minima and referred to "physiological needs", "psycholoical needs", "protection against contagion", and "protection against accidents." I think that perhaps the concept was considerably ahead of performance.

In 1952, APHA put out a proposed housing ordinance. This is something which I remember quite well because I don't know how many other health departments did so but one year later, in Buffalo and in Erie County, where I was health commissioner, we actually used that as the basis for switching the control of housing sanitation from a separate housing de-

---

*Executive Director, American Public Health Association.

Preceding page blank

partment to the health department and, at least at the time, made some real improvements in the housing particularly in the slum areas of that city.

In 1957 the Association published the "Basic Principles of Rural Housing."

And in the 1960s as Charlie Senn knows so well, we started our concern more about neighborhoods.

Now, I think that there is still real need for national attention to those housing problems, both the older ones and to newer ones (or perhaps the older ones in newly devised dress). These include racial tensions, the breakup of families, the urbanization and, incidentaly, urbanization with rurally oriented people being involved, addiction problems; all of these have reflections in the way in which the people suffering from them are housed.

Between 1962 and 1966, APHA organized, sponsored and found funding for the National Commission on Community Health Services. And, here again, the importance of housing our population was emphasized. Let me just quote two things from that," Adequate housing is one of the most fundamental needs, yet government in general and public health in particular have given it scant attention," and "Housing that satisfied the minimum standards of a century ago has been permitted to deteriorate into the slums of today while very little thought has been given to the development of current housing so that it will not become the slums of tomorrow." An indictment which I think most of us would agree is justified.

I would like to close simply by mentioning a hope, my hope, as to one of the kinds of things which will come out of this conference. I think that in the past much of our action in housing has been defensive. It has been mostly attempts to defend against specific hazards.

In the laboratory we have been studying everything from the unicellular forms up to human tissue cultures in a fashion whereby we could analyze quantitatively their needs and their optimum milieu. As a result, we can now provide an environment for them in which we can actually maintain rather complex and sophisticated tissue cultures in a way which is optimum for their continuation and development. During the same time, in the preparation of the most intimate milieu in which man is born and grows and develops, in other words, his housing and his neighborhood, we have been much less successful. Perhaps this is because there has been much less total emphasis on the physiologic, the psychologic, the social, the emotional needs for optimum growth and development to say nothing of building housing to meet those needs.

I think that housing should provide not only physical and emotional security but also stimulation. It should permit privacy but without isolation. The neighborhood should be planned so that children have places to yell and shout and make noise but there should also be places for quiet and contemplation.

There are probably optima for each of these and dozens of other factors which in proper combination would provide us with a human milieu which would encourage development of future generations far above the present norms.

I think that with our present sophisticated computer competence, our growing ability to develop multi-variable models, all we need is the basic technology to identify, to analyze and to measure these factors which impinge on human development in order to conceptualize an optimized milieu which would not be defensive but which would encourage a kind of future generation which we have not yet experienced.

To such an end is this conference dedicated.

THE NEED FOR "SOLVING" HEALTH PROBLEMS OF THE INNER CITY

Paul B. Cornely, M.D.: *

First of all, let me express my appreciation to you on behalf of the American Public Health Association for being present at this conference which is a historic conference. It is the first conference on health research in housing and environment and certainly it is a good opening for the decade of nineteen hundred and seventy.

I would also like to express our appreciation to the Environmental Health Service of the Department of Health, Education, and Welfare for aid in this effort.

And certainly last but not least, all of us are indebted tremendously to Charlie Senn for his efforts in healthful housing because he has been a constant, dynamic, effective person in this area for many, many years.

I have been asked to talk on a topic which is said to be the need for solving health problems of the inner city and I could make it very comfortable for you by just saying that they do need to be solved and let's get out and solve them right now. But I think that we need to look at ourselves just for a bit and this is what I hope to do in the next few minutes.

To me it's interesting that in a community such as ours, we stress affluence. And yet, we enter this decade faced by crises. We have crises in welfare, in education, in law enforcement, in moral and ethical values and we have a crisis in housing. And sometimes I get the feeling that, as Mr. Gardner has so very well expressed, that faced with all of these crises we have a paralysis of the will and are unable to do anything.

Now let's look at the housing crisis—and to a sophisticated audience like this I need not belabor the point. But I must mention four aspects that might be of concern to all of us, particularly in considering the inner city. You can also play this game, by naming four aspects that you consider more important and I will not quarrel with you.

First of all is the crisis which is particularly important to ethnic minorities. I make mention of this first because its fresh in our minds. Les Breslaw, the past president of the American Public Health Association, and I made a tour of six areas last Fall. We were, you know, hard-bitten public health workers, presumably, but we were really amazed at the sort of thing that we saw.

In Texas which has half of the Mexican-American population—there are five million of them in this country and Texas has half of them—we went down to Ward 2 in Houston where the Mexican-Americans lived. In house after house we saw silt and dirt filtering through the ceiling onto the kitchens where people attempted to cook. It was due to a spewing cement mill throwing out all day long fine silt and dirt that affected all of the housing. It was interesting to all of us that when we got there—that day—they had the courtesy to close the mill so that we were not inundated.

And then we went to Tulare County among the migrant workers where they are quite often sprayed with pesticides and their housing is in a dilapidated, overcrowded condition.

Then, at Great Falls, Montana, we visited Indians living away from Reservations. They were living on "Hill 57". It got its name because it was the dump heap for a lot of cans, "57 varieties". Here we saw a World War veteran living there with no water, with a privy and with dirt and trash surrounding him.

And then the thing that really depressed all of us was when we went to Chicago's South Side, the Kenwood-Oakland area. I saw the amazing situation of garbage, trash, condemned housing in which people lived, empty houses where children played, abandoned automobiles left all around, and causing a frustration and a despair beyond words.

People are being brutalized, daily some 30 million or more of them, and this should give our consciences some concern.

---

*President, American Public Health Association; Chairman, Department of Preventive Medicine and Public Health, Howard University.

But this is not enough. Let's take the second item and look at public housing and see what it has accomplished in thirty or more years. There are 800,000 units and 50,000 units are built a year. It is true that more money is now being allocated to public housing, but the number of units being produced is inadequate. And what is public housing today but a prison or a reservation for a lot of people who cannot get out of them because they are "locked in".

Thirdly, the point that we have emphasized in some of our statements to the effect that at the present time Federal government is contributing 1.1 billion dollars per year through the money that the Federal government and states allocate to welfare claims to support slum landlords and slum housing. This is the biggest public housing expenditure that we have in this country—1.1 billion dollars a year.

And then, lastly, another evidence of this crisis is the fact that only a few states, less than 10, and maybe a quarter of the cities of 100,000 or more population, have housing codes that are enforced. And to me this last item is scandalous because in a country like ours it appears that we are much more concerned about animals than we are about human beings. The United States Public Health Service Milk Ordinance makes this very clear. It has strict standards for a milk house and cows must be housed in sanitary barns. I've never seen a farm where milk cows are housed surrounded by garbage and trash. These milk sanitation standards are emphasized, they are enforced and they are effective. And yet we don't do this for human beings.

Now the people in the inner city consider housing one of the really important factors and everybody has admitted that inner city housing is the second most important factor as far as discontent, conflict and aggression are concerned. Therefore, all of us have to really overcome this paralysis of the will and try to do something about the problem. And what is it that we can do? I think that it evolves upon all of us to determine what can be done. There are two or three things that can be done. Some are of immediate concern and some are a little more remote but I think that they should all be done.

First of all, and this is overworked but I've got to say it, we have to be committed, all of us have to be committed to the point of view that our environment needs to be improved. Now, Rene DuBois has put it very well in a little pamphlet called "The Theology of the Earth" in which he states "this country should begin using science and technology for purposes other than increasing the gross national product." The gross national product is our God; 800 billion now with 1.3 trillion in 1975. But DuBois said, "let us use our technology and science for the purposes of taking care of the earth, for the purposes of actually improving the quality of life" and this is what we have to do. He contends that people in Sweden have taken this point of view. This is what we need to do.

Secondly, it appears to me that as an immediate factor we need to look at the problem of dispersal within the cities. I don't think that we can continue with our Federal programs to try to isolate the disadvantaged in the inner city. I think that the Federal proram has to be given a specific thrust in another direction so as to disperse the population within the city through rent supplements, through lease housing and incentives to developers. But it has to be done and we just cannot continue in the present fashion.

Now there is a second aspect of dispersal that I think requires research, study and additional information and that is the approach to dispersal of poulation outside of the cities. I think that the time has come for us to take a look at the shifting and distribution of populations into other areas. All of us agree that cities have become unmanageable, like New York City and Detroit. All of us realize that cities are costly—the transportation from work to home, the highways, and the transporting of sewage and trash many miles from their sources. The brutalization of people in terms of social factors cannot apparently at the present time be solved very well. We keep on patching. We keep on with wishful thinking. But it seems to me the time has come now to determine whether or not we are going to do something in terms of prevention so that the migrations can be redirected and we can do a much more effective job as far as our population in cities is concerned. I think this is a research area that needs to be looked at.

And a third important factor which I think is of importance to the inner city, particularly, is covered well in the report which was prepared by the HEW Task Force, on "The Role of Public Welfare in Housing" which was published in January, 1969, and which Mr. Finch recently sent to the Governors of the states. These recommendations in this report need to be put into effect at the present time. There are some good specific recommendations in that report. There are recommendations, also, in terms of research and I think that some of these need to be looked at. And so I would say that we should take this Task Force report out of the files and see what can be done to implement the recommendations.

We in the American Public Health Association are interested in a fourth suggestion which has to do with the inner city. We believe that the national government has a responsibility to establish certain minimum standards of housing for those clients who receive rent subsidies. The time has come, it seems to me, to stop fattening the purses of slum landlords. And the American Public Health Association is attempting to see to it that a legislative act is introduced in this regard so that something can be done about it.

Now I think also, as a last point, that public health officials have to become concerned, that they have to do something about housing. The people in the inner city feel that this is an anti-service society. You look at all of the agencies for human services and you will see that they are really not doing the sort of thing that they should be doing in terms of people. The Welfare Department does not get people out of dependency, it makes them more dependent. Correctional institutions don't rehabilitate prisoners, they make them greater criminals. Our educational system does not improve learning, it makes children hate learning. And so does the public housing —it provides housing situations which are inimical to people. And so, in terms of the health department, we need to see to it that public health officials do a great deal more in this particular area.

Now there has to be a strategy to accomplish some of these things. And I would like this group to direct its attention to research in political strategy because I think that we need to learn more in that area. We who are in the health field are too inept, too naive, in the matter of political strategy.

The American Public Health Association at the present time, is dedicated to two very important concepts. Number one, that we are going to continue to remain a highly professional organization developing specific scholarly and accurate valid standards, but in addition to that, we are going to devote more attention to social action. But this is not new for the American Public Health Association because Stephen Smith, who was one of the founders of the APHA, was as active an activist as I have known about. We are the ones who have sort of sat back during the past 30 or 40 years. And what we are saying is that the American Public Health Association and all of us here need to join hands, and develop informal alliances and try to really bring this need to the attention with as great an impact as possible upon the Congress of the United States and upon the President of the United States. This society of ours is being controlled by small, powerful, economic lobbies and blocks and I don't think that we should allow them to get away with it.

THE ROLE OF HEW IN THE RESIDENTIAL ENVIRONMENT

Paul Q. Peterson, M.D.: [*]

I am pleased to be a part of this timely conference which brings together a representation of great expertise on so many aspects of so urgent a problem. I wish to thank the planning committee that has made it possible for me to participate with you even though briefly in this important undertaking.

Even though this conference has just begun, from the materials that have been distributed to all of you who are participants, from the comments of those of you who I have had the chance to speak with briefly this morning before this session began, and certainly from the comments of those who have occupied this rostrum this morning, there is a definite air of singleness of purpose that, in my opinion, reflect the words of President Nixon when he said in establishing the Environmental Quality Control Council, "Together we have damaged the environment and together we will improve it."

You are meeting at an opportune time. A time of great national awakening to the crises of our cities and to the beginning of a national will, hopefully to do something about it. We have long been enjoying the good life as users of our environment, we have been markedly resistant to making repairs but now we know that we cannot use without replacement and we cannot damage without repairment.

I need not rehearse the many problems that make up the single larger issue whether its in the building of new towns or the rebuilding of the old or in defining and eliminating the hazards that plague man in his housing and in his environment. The conference program indicates that these will be fully explored by you recognized authorities in the field. Rather, my purpose here today is to outline for you the role of the Department of Health, Education, and Welfare, hopefully, in achieving a quality climate for man's health

First, it is the Department's goal to find

and well-being in his residential environment. out all that can be learned of the effects of the many environmental insults that act singly or in combination against the individual, the family and the community.

The next objective is to strengthen the ability of states, cities, regions, educational institutions and those organizations vitally concerned with this problem. We must provide these elements with the information, the technical assistance and the program needed to modify man's environment in his home, his neighborhood, his community. The Department with its considerable competency must in effect become a laboratory, a laboratory I must say in which the accent shall be on the first five letters of that word—"labor", rather than on the last seven letters of that word—"oratory".

In trying to achieve these objectives, top priority must be given to the development of more complete, adequate knowledge and federal leadership in this field. The Public Health Service as the health resources focal point for more than a hundred federal-state programs must adequately serve the national needs for data, and technology for monitoring and for technical assistance.

I have been weighing a number of steps since being invited to participate in your conference which I considered important to the achievement of our goals. Let me make quite clear that the things that I am sharing with you now are not Departmental policy. However, they are my own thoughts and I indicate to you that insofar as it is possible you may count on our commitment for us to exercise some influence in arriving at positions that will embody some of these positions.

We should identify the effects of the residential environmental stresses and, hopefully, develop means of reducing or minimizing their effects on man. We should identify not only these existing elements but also be sensitive to and identify early, new emerging stresses and evaluate the consequences of these hazards. This research will require the collaboration of people with a variety of skills and professions, scientists, engineers, epidemiologists, in order for us to arrive at successful environmental understanding of the problems so that adequate health programs may be developed.

---

[*] Deputy Surgeon General, Public Health Service, Department of Health, Education, and Welfare.

In addition to our preventive efforts, we should seek to improve prevention and health measures in environmental improvement programs of other agencies by entering into agreements to develop criteria for controlling such specific hazards as over-crowding, noise and inadequate servicing with public utilities.

Second—federal research and information resources can only serve local program responsibility if there is an adequate pool of manpower in the field to apply the measures that have been identified. Not only must new personnel be trained but a large portion of the practicing profession and the allied health workers now in the field need to be reoriented to preventive health in the residential environment and brought up to date on available modern technology.

Third—technical assistance has been limited due to manpower shortages in fields of housing and city planning, in education and in social services. These shortages have been largely responsible for the lack of environmental health components in model cities programs and in other community health efforts.

Paralleling the priority given to the development of knowledge, emphasis must be given to strengthening the capabilities of states, cities, and regions to deal effectively with their own problems utilizing immediately available technology. More than a mere rechanneling of money we should offer them the opportunity of increasing their capacity to function as a part of a network of professional services and financial assistance. The quality of the urban and rural environment and its impact on society's health and well-being demands that available knowledge and programs be utilized now to the fullest extent possible.

Fourth—during the next few years efforts should be made to initiate pilot and demonstration projects to implement known practical and quickly available approaches for attacking the problems of basic sanitation in rural and urban poverty communities. Such demonstrations should emphasize the mutual responsibility of government and non-government agencies and of private citizens in attempts to improve and maintain environmental quality of residential communities.

Fifth—the process of environmental health programs at state and local levels has been hampered by the fact that the funds available under the Partnership of Health Act have been used principally to support existing programs of medical care. Allocation of 314(e) monies for projects to demonstrate prevention and environmental control programs, in my opinion, would be desirable. Some say new legislation authorizing comprehensive environmental health program planning would be desirable. In my opinion, while it is possible to achieve that goal through new legislation, it would be my recommendation that the present authority be used so that we would not establish yet another categorical program but could plan in a comprehensive manner for the environment and for personal health under the single authority.

Cities are often overwhelmed, financially and organizationally, by the magnitude of industrial technological revolution, the population explosion, and by social conflict. Nothing can be so devastating to a state authority and to acceptance of local responsibility than public belief that a problem is definitely out of hand. The first key, then, in my opinion, is in community environmental management and technical assistance, monitoring, surveillance training and professional services that clearly establish strong and knowledgeable leadership in the field.

Another problem that has developed is the placing of a high priority on activities with early payoff. In my opinion, consideration should also be given to initiating several programs that require a number of years before they can become operational. Their impact, in the long run, may be as great or greater than that produced by short range, jerry-rigged programs.

We must also not allow ourselves to lose our perspective in judgment regarding the nature of the problem we face. So much attention has been focused on the need for medical care and its spiralling cost that we are overlooking a major point of leverage. To reduce burdensome medical costs, attention should be given to the ills of the environment, basic home sanitation, vectors of disease, overcrowding, home injury and lack of community facilities and services. These community environmental problems must be given attention. In housing code enforcement one deficient area is the lack of adequate coverage of all the population by minimum housing standards. Therefore, mandatory state-wide housing codes have been proposed. Again, in my opinion, the Partnership for Health under Section 314(e) of the Public Health Service Act may very well provide an avenue for support of projects in this field. It is broad enough in its stated purpose to provide support for actions such as furnishing technical assistance to local government on formulation of housing codes, support for state housing code inspection and enforcement activities, establishment of a state staff to implement state housing codes or to give aid to the various communities in the initial inspections required and the adoption of local housing codes. In this regard, you should know that I believe Federal, state and local health agency responsibility for environmental health protection through housing codes extends to all people in all portions of each state.

One of the approaches that should be considered for a prompt attack is pooling of initiatives and resources among all government agencies. Assuredly the Federal government regardless of budgetary consideration must share certain areas of responsibility and provide leadership and we in the Public Health Service will do all in our power to follow through on these, our responsibilities.

Secretary Finch recently said, "the environment is everybody's bag". It is my opinion that Mr. Finch's concern is that the great awakening of public interest in the environment might subside as quickly as it emerged. You and I have both seen this occur but we cannot let our interest in environmental problems become just another fad. Man and his future are truly at stake and that is our principal and chief consideration.

Albert Einstein said, "The concern for man and his destiny must always be the chief interest of all technical effort. Never forget it among all of your diagrams and your equations."

We must be determined, we must be optimistic although perhaps not with the optimism of the poet who pled, "Dear Lord, forgive my small complaint but if I had my druthers, I'd help those who help themselves if you'd help all the others." Thank you.

HOME AND COMMUNITY HEALTH: AN ENVIRONMENTAL PROBLEM

Mr. Albert H. Stevenson: *

It's a great pleasure to be with you at this Conference on Health Research on Housing and the Environment. Most of you have, for a long time, been concerned with problems of the environment and today it is a cause that has come into its own. Suddenly ecology is a household word and almost any tenth-grader can tell you what it means.

And, before going on, I would like to make some comments because I have seen too often, particularly in the United States, that we talk about pollution control. *We all know about pollution of air, water and land. If we can solve this problem, everything would be fine from the standpoint of pollution control but that doesn't necessarily mean that we would have a quality environment. I would like to briefly give you at least a definition that I have been using. Environmental quality in its broadest sense is a measure of all the physical, biological, social, economic and cultural conditions and natural beauty which relate to the habitat of man and other species.* Thus, environmental quality is directly related to human behavior, the spirit of life and the survival and procreation of the species.

And yet, *there are some who feel that the current concern for a quality environment may distract national attention in some way from the urgent problems of poverty and inequality which would seem to demand priority over all other domestic issues.*

And yet, all of us who are here today know that this cannot be the case. The search for answers to our environmental problems must involve the reexamination and a reevaluation of our traditional way of making decisions in every sphere of our national life. And such a reexamination is bound to show that the problems of environmental mismanagement are in true ecological fashion *part and parcel of the other social and economic problems of our time intricately rated both as causes and effects to the life style of every person in the United States.*

Those who would separate this concern for the environment from a concern for social problems simply have not really learned what human ecology is all about, that the same failure to see the problem whole that threatens Lake Erie or the bald eagle or the giant redwoods has also produced urban decay and rural blight and the economic and social and health problems that accompany them.

It is assumed by too many people that concern for the environment is limited to the problems of pollution. These are formidable problems, with awesome significance for our own lives and the lives of those who will come after us. Yet the degradation of the natural environment is by no means the whole of the problem, and no part of the problem can be solved simply by waving the magic wand of technology, while we go along in the same old way trying to eat our cake and have it too.

We live in an environment of land, air, and water, to be sure. But we live at the same time in an environment of home, school, work, and recreation. And we use and consume the products of our own technological genius which thereby becomes part of the environment of human life.

The people who live in cities bear the burdens of land, air and water pollution but they are subject as well to the burdens of noise, crowding, estrangement from the natural systems and the inconvenience and frustrations that characterize urban life. *The urban poor bear the greatest burden of our mismangement of the urban environment.* But even far from the city, misuse of the land has created rural blight that testifies to the squandering of precious natural resources and rural slums that degrade human life.

Some 34 million Americans live in 11 million dwelling units that are either overcrowded or have structural or plumbing deficiencies. I might add many of our water mains in some of these sections are still of lead construction. Infant mortality in these areas is 3 to 5 times the national average. Injuries, burns and accidental poisonings are from 5 to 8 times the national average. More than 14,000 rat bites are recorded annually, but obviously this is an insignificant portion of the total that go unrecorded.

These urban and rural conditions are part and parcel of the environmental problem. They contribute to it and in a vicious cycle that is part of the ecological interaction I spoke of earlier, they are intensified by it. The whole environment we are creating for ourselves is the sum of thousands of economic, social, political, and technological decisions. *The urban poor are, in many cases, the displaced victims of rural blight. Those who flee the city create suburban sprawl and join the long lines of ill-tempered* commuters who move at horse and buggy rates on high speed highways that have been built to get their high performance, air polluting automobiles into a traffic clogged city where they can find no place to park.

The President, in his State of the Union message, has pointed to the need for a national growth policy to upgrade both urban and rural environments and conserve natural resources. *There is no question we need to find ways to free ourselves from the seemingly uncontrollable forces that are leading us down the road to environmental chaos.* Can we actually expect to bring pollution under control in the years ahead if we accept as inevitable a pattern of progress that will soon place most of our growing population in unmanageable supercities stretching along the perimeters of the continent with a vast and empty wasteland in between?

---

*Deputy Administrator, Environmental Health Service, Public Health Service, Department of Health, Education, and Welfare.

Concern for the environment is essentially a concern for man. And the decisions which we are going to have to make in the seventies are going to have to be made on the basis of human health and welfare. *We need to advance as quickly as possible our understanding of what is actually happening to man in this changing environment.* Not that we can afford to wait to have every scientific "t" dotted, crossed and every scientific "i" dotted in the science of human ecology. We need to move ahead as quickly as possible to put to work the scientific knowledge we already have.

But there can be for us no return to some illusory Eden, where everybody was unclothed and uncomplicated, where all the air was sweet and all the streams were silver, and all life was simple and everything was just swell. Machines are as much a part of our lives as muscles and mountains. *And we can no more do away wth technology than we can let it do us in. We have to learn to live with it, to use it to shape a world that will sustain life without at the same time stifling it.* Since we cannot and surely would not want to restore the earth to its condition on the seventh day of creation, we need to know how much air pollution, or crowding, or noise, or chemical contamination is permissible, or tolerable, for human health and well-being.

And finally, *we are going to have to understand that we cannot deal adequately with the unwelcome byproducts of a complex industrialized society as though they existed outside the total structure of that society. Our environmental ills are, in part, the wastes of our affluence, left over from the ways we transport ourselves and our goods and from the ways we generate energy to heat and light the places where we live and work.* They are part and parcel of the ways we produce and package and dispose of a multitude of goods and of the way we grow our food and build our highways and of the way we plan, or fail to plan our cities.

I would like to expand on a couple of these, particularly two. Take *electric energy.* Consumption is currently about 1300 billion kilowatt hours per year. It is projected that within the next 10 years, by 1980, that will be doubled—now this in contrast with population growth, well we are expecting what, another 100 million, that would be 50% by the year 2000 in the United States. So, the rate of electrical energy consumption is at a far, far greater rate than that we are experiencing in the population. Obviously, we will be getting more and more into nuclear powered plants, what does this mean for our cities and so on. The tremendous heat discharge from the plants—can this heat be recaptured to be used for example in our cities or our costal cities. I think this a part of this planning of the residential environment.

Another area is solid waste. Currently the per capita per day discharge of wastes that are collected in municipalities is about 5.3 pounds per person per day today, increasing at about the rate of 4% per year. Again, much faster than the population increase. So it is projected that within ten years it will be about 8 pounds of waste per day other things continuing on an even keel.

Now, we really have four problems associated with this solid waste. First, we have the population increase, whether it is population or urbanization which again means population increases. Then we have the per capita increase on top of that. Now we are developing a lot of wastes that are more difficult to degrade, you know they are using aluminum instead of tin cans and this is a longer range problem for handling. And then lastly, we are limited by certain areas of consideration in our communities. We have used up some of the land for disposal so we have greater distances to travel to get rid of the waste or, if we use incinerators, we have another consideration obviously from the air pollution control groups. But here are four, four factors, now. So what have we got in the future in this area? I think we have the reduction of the generation of wastes, collection methodolgy which certainly needs improvement, we have some fairly archaic means of collection really if you consider a nation that is in the position we're in with atomic energy development, the space age development, and so on. There is a question of reclamation, recycling and reuse of these wastes. There is a potential or I think hopefully a good one of the use of the waste for power generation to help provide part of the electrical energy requirements of the city and possibly to do this in small component units that can be spaced around the community without causing air or other pollution considerations.

Now, this *conference is a recognition that the problems of environmental health as they relate to housing and the residential environment are not of the future but of the present. We know that within the next 10 years our nation must build or rehabilitate 26 million dwelling units, at least 6 million of them for low-income families.* How can this be done? We don't know enough of the answers. But we do know we can't go on building houses by a hit or miss methods of the past like a barnstormer of the 20's trying to fly a new superjet by the seat of his pants.

We need first of all perhaps to define our priorities. How are our resources best spent? Is it better to upgrade houses slightly in small increments over time for many people or is it wiser to put fewer people into truly adequate housing? And how do we define adequate? I hope that you at this conference will move us closer to a practical definition, will help us to evaluate health criteria in housing to determine which must be maintained and which, as a practical matter, do not significantly affect health and well-being.

Now, we have spoken of, two of the previous speakers commented on housing codes, I think I will take a little different twist. As you all know, one of the principal obstacles to meeting our housing needs is *the existence of archaic building and housing codes, relics of the horse and buggy era, which effectively prevent the use of innovative ideas in housing construction or rehabilitation, and bar new products which may be far less costly than traditional materials, either in themselves or in the total installation costs.*

On the other hand, there are relatively few cities in the United States that have any requirement at all with regard to soundproofing in multiple dwellings, while urban areas and households become steadily noisier, with adverse effects ranging from the loss of privacy and interruption of sleep to potential hearing damage. A good example, my secretary rented a brand new apartment in Silver Springs one day, the next day she came in and she said, "You know I couldn't sleep last night because the man in the next apartment was snoring". It seems to me a pretty sad state that in 1969 in the capitol or right close to the capitol of this country, we don't even have this as a built-in requirement. And, of course, the answer is that economically it is, you know, I'll lose and I can't be competitive with the next apartment builders. Well, I wish a few of you would rather take your pencils and papers and figure out whether it is 5 cents a month or 10 cents a month extra rent somebody would have to pay to have this privacy which I think is vital to a quality environment. Construction activities, transportation, industry, population densities, and household convenience equipment all have an impact on this rising decibel level.

Now, in the Environmental Health Service, our community environmental management program has been attempting within the limits of its resources—and I assure you that they have limits, they are much lower than we would like or Bob would like, and Bob's done nobly trying to get them increased but we haven't been as successful as we would like—anyway, within this limit, *to define and alleviate some of these problems relating to the home and community environment.*

We have been working toward improved, comprehensive urban rat control.

We are developing programs, for implementation by local governments, to reduce the incidence of lead poisoning.

We are working on an improved APHA-PHS Recommended Housing Maintenance and Occupancy Ordinance.

We have been trying to stimulate the Health Educator Aid Program to serve inner-city residents.

We are developing the Neighborhood Environmental Evaluation and Decision System, otherwise known as NEEDS, to facilitate the appraisal of housing especially from the health viewpoint.

We are working in the area of pedestrian safety with emphasis on retro-reflective materials to increase visibility especially of children.

We have been conducting studies on carbon monoxide, electric shock and burn hazards with the view of developing better standards in home safety.

We are supporting research relating to various aspects of housing and community health. The effect of the residential environment on health of the aged, for example, and the impact of improved housing on health, school attendance and crime rates.

Other projects are aimed at the development of guidelines for reducing environmental hazards in new towns.

We are supporting research into the specific thermal and toxic chemical hazards associated with the heating and burning of various building materials.

And another project is designed to determine more exactly how people perceive the space around them, their subjective reaction to building grouping, crowding and so forth. After all, density in housing, like beauty, is to some extent in the eye of the beholder, some high-rise housing may have a population of 2000 per acre but seem much more attractive and spacious than less crowded but poorly planned housing.

I hope that your meeting here this week will provide all of us, inside and outside of government, with some new insights as to how we should direct our efforts in this vital area. We need the best, the most intelligible, the most meaningful data possible in order to formulate criteria, establish priorities and make real progress toward a more livable home and community environment.

If we use our tremendous scientific and technological skills wisely and well, we can create the kind of world in which human life will be enriched as never before. But we cannot postpone action until toworrow or another year or another decade. As President Nixon has said, "It is now or never" Thank you.

OPERATION BREAKTHROUGH

Mr. Alfred A. Perry: *

This is my first opportunity to address a group of peers who are so actively engaged in the survival of our nation. Sometimes we are so close to the problem that we take it for granted and become unaware of the difficulties of our charge.

When I contemplated addressing this group I found myself in that usual dilemna that most public speakers are faced with. How do you best address your audience? It reminded me of the dilemna that the late Al Smith faced when he was governor of the State of New York. As a legend in his time, he was never short for words except for one occasion. In his first year as governor of that State he had to make a required tour of Sing-Sing Prison. After his tour all of the inmates were brought back to a large hall to hear a few words from the governor. And the governor, quite used to addressing public audiences, stood up and said, "My fellow citizens"! He stopped and realized that the inmates of Sing-Sing are no longer considered citizens. But he recovered quickly and he said, "My fellow convicts". He realized he was again wrong, but he recovered quickly when he said, "Well, I'm very glad to see so many of you here." — And I am glad to see so many of you here concerned with an obvious national crisis.

I would like to address the subject of pollution—or that which contaminates. And now several people are going to look at their program and say, "Wait a minute, I thought this fellow was going to talk about Operation Breakthrough"—and I am. But in Breakthrough we too are concerned with environmental pollution.

Now, usually when the word pollution is mentioned, the obvious elements of water, air, and soil immediately come to mind. There is a fourth element which we include in our total thinking process in Breakthrough; pollution of the mind. I would like to comment on this briefly with the idea in mind that it is not my intention to articulate these four areas which are well known to you but to appraise you of our overall view of the four as we assess them in Breakthrough.

Basically, we are approaching the concept of cause and effect. Knowing the cause, we believe we can find solutions to the problems. In the area of water, I believe all of you agree that we can no longer accept the Biblical Dead Sea as the sole standard for ugliness of a water body. It now has a number of companions. The major underlying reason for water pollution in this country is that we are unable to obtain satisfactory service from our municipal sewage treatment plants on which we have imposed excessive loads over the past few years. The cost of providing adequate sewage treatment and facilities is going to be some 30 billion dollars through the year 2000!

On the subject of air, one of the accomplishments of the space program has been to give us a better perspective of our situation here on Earth. Scientists have been pointing out for many years the relative fraility of the envelope of the atmosphere which surrounds our Earth. And now that we have had a closer look at the desolate landscapes of some of our neighboring planets in this solar system have, along with a view of this lush Earth from outside, we now know the importance of preserving our environmental heritage.

When we think about soil we have to go beyond our understanding of the daily garbage and trash that we think about because we must understand that we have commenced on an extensive use of chemicals so strong and lingering in their effect that it is yet indeterminate as to what total damage will be to this Earth.

The fourth element is pollution of the mind. Now what do I mean? Our current national behavior suggests that we almost encourage perversion of the mind. It certainly suggests that our sanity and common sense are in question. Think of the following problems that affect us environmentally—noise, our speech and language, our literature, our personal values, crime, our version of honesty, sex, love, loyalty, war, and our educational institutions. In the pollution of the mind we find ourselves, in the area of religion (a subject refrained from by public speakers), questioning our national faith. In essence I would say we are having a general turning away from God, to me, the basic reason this nation was created.

What I am saying is that anybody involved in a "grand design," in "grand planning" must in fact address himself to all of those elements. These all add up to "social environment."

The basic element of any community is the concept of shelter. From this point we add all of the essential supportive services and requirements for the chosen life styles which are required for survival. At the Department of Housing and Urban Development we have separate and interrelated programs such as New Communities, Model Cities, and Operation Breakthrough which are coordinated with life support systems from other aspects and elements in the Department. I am fortunate as the Program Director of Breakthrough

---

*Director, Operation Breakthrough, Department of Housing and Urban Development.

to be one of those as dedicated as yourselves in reversing a national trend toward a totally polluted society. That's part of what Breakthrough is about. When Secretary George Romney came to Washington he looked at the housing scene with all its inherent problems, and the sadness of the housing picture for the future—and it is reported that he accepted what he considered the toughest challenge, to head up HUD.

What is the problem that we are faced with? And why is a breakthrough required? It goes something like this. The nation needs roughly 3 million new units a year to satisfy its housing needs, yet our housing industry, with all aspects going for it, can only produce an average of a million and a half units per year. Today it's popular to blame the morgtage industry but I well remember in the early part of the sixties, when mortgage money was adequately available, we still could not deliver more than a million eight to a million nine hundred thousand units. So Secretary Romney realized that what was necessary was a national posture, a force, a thrust, a program which would force the housing industry and American industry over a threshold into a new era.

Our aim is to produce quality housing in volume for all levels of our income. Breakthrough is designed for housing to satisfy the need at all income levels.

Secondly, we address ourselves to the idea of bringing about a new integrity in the quality of housing. How are we going to bring this about? We have entered into a working arrangement with the National Academies of Science and Engineers, National Bureau of Standards, and HUD to develop a very sophisticated testing and evaluation process. This testing and evaluation will be carried on at the Bureau of Standards and at the prototype sites. The essence of it is to make sure that new technology which has been proposed to Breakthrough does, in fact, have its chance in the marketplace.

Breakthrough came about in the following way. Secretary Romney believed that what was required was a national competition, not an interdepartmental research program. So, what we did was ask for proposals from across the United States, from Universities, American industry, financial institutions, and various producers. We asked what was their version of how to solve America's housing needs. We received over 600 proposals. These were reduced down to 22 and these 22 housing systems were announced last month. We no longer call them a building process. We refer to them as housing systems for Breakthrough addresses itself to the concept that the systems approach to problem solving is the best way to meet these goals. The systems approach is an adaptation of the NASA Space Center's concept of marshalling men and materials to meet an objective on specific milestones. That, in fact, is what I am proposing this afternoon, that as you enter your "workshops" hopefully you will not return to your offices only with eloquent papers eloquent thoughts and eloquent comments. What I suggest, and in fact I think our nation demands, is that you must lay out specific goals, proper understanding and objectives against a time schedule and requirements of money necessary to meet the objectives of solving the problems of pollution in the forms that I have described here today.

In the test and evaluation process, It is our intent to address ourselves to the very things I have mentioned here. What are the health needs? What are the environmental needs and requirements? What is the leadership that we must provide? For that's what Breakthrough is all about. It is a catalyst in a leadership role making a grand attempt to show American industry and the nation in general how to solve our housing needs without creating instant slums.

The essence of our management systems approach to problem solving is fully realizing all of the tasks and the elements of the problem, and making sure that you don't overlook the obvious. This is oversimplification of it but at HUD we do have staff and personnel capable of working with you and other agencies in solving this problem. The very fact that we are here jointly implies that we are willing to enter into a joint arrangement with agencies and individuals within the government and outside the government to address ourselves to the total pollution problem.

In order to solve the land planning and community environmental aspects of Breakthrough, we entered into contract with eleven nationally known site planners and architects. They will be designing the communities on the ten prototype sites that we selected in ten states across the United States. We intend to break ground this summer and we will build our housing systems on each of these sites and should have them ready for the market-place by early spring of '71. Why are we attempting to work hard to bring new systems to the local marketplace and asking local code enforcing groups to step aside and allow us to demonstrate new technology? Why are we asking labor to cooperate by allowing the new industrial process into the local marketplace? And why are we going through such an elaborate testing and evaluation process in order to prove this out? Certainly we are not interested in some grand annual award for this would be a poor reward. What we are saying is that the housing consumer of the United States has had a bad deal in housing for too long. But until we develop an integrity and a level of trust in housing for those that supervise it, the consumer will continue to consider housing a bad deal. Therefore, it is our primary objective to provide the proper environmental type of life, the life style, and product acceptability in housing that he enjoys in other consumer goods in the United States.

This is really a rather new approach to housing. We are very hopeful that we will see the long-term warrantee and guarantee replace the so-called 30-day guarantee and a one-year builder warrantee.

All of us here are engaged in a national philosophy of pollution control. The central question is not whether we shall have pollution-free communities but how free of pollution, at what cost and how long to do the job? I think this is your workshop effort. Our challenge is to identify the complex sources of pollution and keep them within socially and economically tolerable limits. Money alone cannot do the job. We,—you and I—must develop public support by bringing the public face to face with the realities of our time. It sounds like it's really all bad news and I did mean to bring you good news. I think the fact that we are here facing up to the problem, is in itself good news. But the answers must come from professional groups such as this. We cannot assign it to another research task force. We must address ourselves to the fact of the times and above all we have to remain eternally optimistic—at least until they start marching the animals, in pairs, down to Cape Kennedy.

Thank you.

Frederick Bair:

In the current statistical miasma, it seems to me that we are misguided. Last year we produced more single family dwellings than in any year during the sixties. Our current total production is not a million five, its a million nine. The 400,000 mobile homes which were produced last year are low-cost housing. Why during the excitement about Breakthrough do we ignore the fact that we have this resource for low-cost housing and why do we consistently understate the current housing production?

Mr. Perry:

I believe I stated that our average for the past year was a million and a half units a year which is pretty carefully documented.

Mr. Bair:

Our total last year was a million nine.

Mr. Perry:

That's correct and we need 3 million units a year.

Mr. Bair:

Well, the figures that are quoted on what production was last year are a million five. We consistently ignore this 400,000 units in our housing statistics.

Mr. Perry:

Well, we are not going to get into a debate with you on that number. I only have access to statistical records the same as you do, sir. I would say that we are far below a million nine for last year in housing production. We do not ignore the mobile home unit. It is my opinion that mobile homes represent today in the marketplace the best value for housing available to the public. Out of Breakthrough we are very encouraged by the estimated costs of these new housing systems and fully expect to compete favorably in the marketplace with that price housing. We are at least a year away from that.

Dr. Raymond Neutra:

If this conference came up with some specific, identified needs in housing, and identified some research projects which, within a year would come up with some hard answers on health needs in housing, how do you think that could be implemented in Operation BREAKTHROUGH in the near future and over the next decade? How does this information get used in influencing design and what are the administrative constraints and the legal constraints which either facilitate applying this knowledge or work against it? We have seen problems with the automobile industry, we know things about how to make cars safer, and yet there is great resistance to applying some of those things, as one example.

Mr. Perry:

Let me answer the legal part first. The first problems that we are confronted with, legally, are patent rights of the producer of either the product or the concepts and each one is treated separately. The second legal problem we have of any major consequence is codes. Now, we encourage all proposals that have to do with housing to be presented to us. Breakthrough is broken down basically into two categories, Type A and Type B. Type A are housing systems—these were systems selected which we believe can commence production this year. Type B are on-going research concepts, either inventions, drawings that have never been implemented, or the small production type concepts which have not had an opportunity to be in the marketplace and need additional funding; new concepts in marketing; new concepts in sound control; new technology, new versions of the financing; title research, and on and on. We are now evaluating these and we have only announced a few to date.

Breakthrough, as I said in my remarks, is really a catalyst to bring together the concepts—proposals such as those that might come out of this group—and we bring that into the marketplace and make it known to American industry and the public in general. We are actually a platform, an open marketplace acting on behalf of mutual exchange of information and concepts.

When I travel across the United States, it's amazing that a housing industry so old still has so little communication within itself. I think Walter Reuther may have been more right than he intended to be when he said, "The housing industry is the only American industry to have survived the industrial revolution intact" Sad as it is, I think he is to a great degree right.

Mr. Erkilla:

I would like to ask Mr. Perry what is HUD and the Operation BREAKTHROUGH considering with regard to the high cost of money as it relates to housing. As you know, this is perhaps one of the greatest economic constraints the consumer has to the ownership of even low and moderate income housing.

Mr. Perry:

The money problem, I am convinced, will be solved. It is a matter of at what point in time. The President has met with several groups and has publicly announced his intention to bring about a solution. I do not believe that the banking fraternity has met the challenge of our time—to step forward with new concepts and new understanding of how to manage money—to put it in the hands of the consumer and at a price he can afford. An example is that I do believe we will see a trend toward the acceptance in America of land lease rather than total ownership. Now I realize American tradition says that owning the soil is foremost on our minds. But when you consider the size of the mortgage on your home, I think you have to ask yourself who really does own your house. So the business of leasing, of renting, of the long-term ownership with option to buy, this is all going to come in the financing discussion in the very near future.

Dr. Maurice Broady:

I'm Broady of South Hampton, England. I speak a rather skeptical question with every kindness and good will. We have the confrontation—sorry, that's probably not the right word to use—we have had Professor Cornely telling us of the very adverse housing conditions he found on his tour around the country, and we have had Mr. Perry putting up as a solution this "housing systems". He tells us money is not enough; we need public support. But we have seen public support seeking generated in the country in other ways. For example, the last time I was in the States similiar systems were being advocated under the Poverty Program. Again, public housing, designed to alleviate the worst of your housing problems, has been severely criticized for failing to deal with that specific issue, notwithstanding the 'workable program' provisions of much of your housing and planning legislation. It seems to me, therefore,—and with great respect to Mr. Perry's comment, this really doesn't come out in what he has said—that the problem is not simply that there is not enough money, nor enough public support, but that the political and economic structure of the U.S.A. is quite inadequate to deal effectively with such problems. That, with great respect, did not come out in your explanation of Operation BREAKTHROUGH. You speak of the necessity for meeting the challenge of our times. I would invite you to explain to us *how*, as an administrator of a technical program, you view the political problems that need to be considered if a technical program of this kind is to be effective in meeting Professor Cornely's problem. That seems to me the guts of the matter!

Mr. Perry:

Operation BREAKTHROUGH to be properly explained is worthy of an all day panel. One of the reasons I believe it will be a success is because I have been a housing man in the private sector from industry and have had to address myself to the problems of meeting the bottom line, as they say, making a profit. I feel that the elements that we have incorporated in our thinking process go beyond pure technology. If I can comment with the luxury of 20-20 hindsight, I believe one of our failures in the past thinking about housing was that it was purely technological and political. The elements of housing, to my way of thinking are these: talent, capital, land, product, market, labor and government. Incorporated in market we usually used to have a subheading called social and economic mix. I think it is worthy of even becoming the eighth element in housing today. Breakthrough addresses itself to all of these seven or eight elements at your choice. When we go into the marketplace we realize that we are confronted with tradition, and vested interests at the local and state level. I believe that state and local municipalities will allow this new concept in housing into that local marketplace. I think we are quite often wrong, also, in saying that we have antiquated codes. I think it is the lack of the ability to interpret codes, inability by the local inspector to become current with what's available in technology which is the constraint against allowing new systems into that local community.

There is another serious question as to whether we can afford the luxury of social stratification caused by restrictive zoning practices. Breakthrough will insist, that any community developed in the prototype sites and any community which receives the HUD certified seal for Breakthrough at a later date, will be an open community. Now this is being resisted in many of our areas of the country. Those of you who have read some of our confrontations realize that people are saying almost everything but what's really on their minds. What they are implying is, "I have 'earned' my choice, my way of living. I don't want low-income groups subsidized." What I believe is that Breakthrough addresses itself to an American cultural crisis. The American cultural crisis I am concerned with is this: I don't feel we can enjoy the luxury of having a split society with an ever-widening cleavage between the affluent and those that do not have and enjoy the American system. This cleavage becomes wider and wider. The reason for my concern is that Communism is waiting for the opportunity to step in and fill a vacuum. I'd hate to see that Lenin was correct when he said that they won't have to have a revolution by arms, "America will drop like an overripe fruit into our (communist) hands". So we must concern ourselves, you and I, to the larger question, that is a survival of our American culture not just a technical revolution.

Mr. Joseph Lanoix:

Mr. Chairman, I am with the World Health Organization. I would like to tell what I have observed in the course of our studies of the health aspects of housing which we in WHO have been carrying out for the past ten years in all types of countries, including affluent USA. In every country, some proportion of the population is unable to afford to pay for housing. Now I have observed the situation in two countries which I can name, one is a good capitalist country (since you have used the word communist, I could use the word capitalist country). I mean Venezuela, and there are two gentlemen here from the Ministry of Health of Venezuela. That Ministry has been actually assisting the low-income group, the rural folks of that country, to get decent healthful housing at no profit to the government, and no profit to builders. Another country which is doing the same thing on a broad scale, not only in rural but in urban areas as well is the USSR. WHO has held two seminars in the USSR on the public health aspects of housing, not on the economic and financial aspects. Still, we were able to observe that in the USSR, the government heavily subsidizes housing. And why do they do that? In order to provide, as I say, decent healthful housing, not luxury houses. Venezuela doesn't either, Venezuela provides a house for health purposes. Why? Because, as you probably know, Chagas disease which prevailed in the country is transmitted by a vector which bred in the walls of the dilapidated houses of the rural poor. So, the government decided to build better housing for health purposes. Again, I am not talking about luxury housing. Now is it necessary, Mr. Perry, that all housing for all people, involve a profit for someone? Is it not desirable that, even in the United States, some housing be subsidized? This is my question.

Mr. Perry:

First of all let me say, sir, that all housing or almost all housing in the United States is subsidized. Now there are a lot of people here that are going to say, "Whoa, wait a minute, nobody gives me anything. I pay the bank, and my taxes out of my own pocket". The truth of the matter is we have to understand the semantics of the word "subsidize". When we realize that as tax payers we receive a deduction for the interest payment on our mortgage loans on our income tax return that, in fact, is a form of subsidation. If you don't think so wait until Internal Revenue suggests taking it away from you sometime. We do have subsidation in this country at great extent. In HUD we have several programs for subsidation of interest payments and subsidation of low-income groups in many forms. We do have housing laws and programs for limited dividend corporations. I do believe that we have some failures when the government produces housing because of its plainness. But we did discuss the Russian housing program at one time and we are worried that the industrial process, the creation of Industrial processes that is coming out of Breakthrough may, in fact, turn into the Russian industrial process. We have a weather eye out for this. Our concern is a mediocrity, a plainness, a simple standard in order to create housing in a hurry and end up with a sadness across the countryside.

We have addressed ourselves very keenly to architectural concepts. We feel the best of our professional ability lies with the private sector and not necessarily with the government. One last thought, I don't believe it is really a problem to produce 3 million housing units a year in this country, if you don't mind the government going into housing and if you don't mind housing being produced at 50 to 100 thousand dollars a unit being sold for 20 to 30 thousand dollars a unit. I think it is a good way to go broke. Secondly, we have an industry capable of producing the needed housing in the country. I think we'd have to give them a chance first, before the government takes over.

Dr. Paul Cornely:

I was encouraged by the remarks of Mr. Perry because of the fact that he said that the President had stated that money would not be of any concern. We in the health field, have a little concern about this because we have not received much. As a matter of fact, it has been cutback to the bare bone and I think that this is an important consideration. The last two speakers have put their fingers on specific problems here. We need not have to talk about capitalism or communism in this context. Actually, what we have to talk about is the fact that at this moment of time we need to effect a transfer of wealth and power, so that they do not remain concentrated in the hands of a few. Now I have some questions about Operation Breakthrough. In our country we have a tendency, to have demonstrations and to have breakthroughs. We had it with the Mental Health Act. We wanted to put up 2,000 community mental health units and we only got to 450. We have had it with OEO. We wanted to get many comprehensive neighborhood health centers but so far we have only gotten 50. Now what are these ten prototype communities? Are we going to be able to really move on so they just don't become "demonstrations" so that we can meet the problem now, in the next two or three years. We can't wait, the people can't wait, the pollution of the mind about which you are talking is taking place every day. I mean, the pollution and the brutalization of these people is taking place every day in the garbage and the trash that the kids have to play in and we just can't afford, as I see it, the luxury of waiting, and we have to move right now.

I want to make one last comment. I don't quite agree with you about the fact that, we've got to "produce for consumption". I think that, here again, we are getting into this hassle of production for consumption—"gross national product". More consumers, more economic goods, and more of the same old thing. This does not get to the point that you have made, that we need to use our abilities to improve the quality of life. It bothers me when you put these two things together.

Mr. Perry:

It doesn't bother me a bit. I believe that because I know the system works as an incentive system. It is the way that we can produce the dwellings needed beyond what I believe is the capability of the government to do it. There are two schools of thought on this. In fact, they are becoming entrenched rapidly. One side says the U. S. government will, in the end, be the main producer of housing. The other side says, no, the private sector, industry will be the producer of housing. What I am saying in Breakthrough is, really, the two things. One is the method I have described which is really the means to the end. The end result is what we are after which is the environmental society that I described. The process of producing three million units a year is open to opinion. Obviously, there are those who believe it can be done if we trust industry. I happen to believe in them because we have brought about something unique and its this —we have brought about a joint venture between government, industry, labor and the consumer. You and I are consumers. I believe that if the government produces housing the variety and choice that will be offered as a place to live is going to be very, very limited— very limited.

Mr. Stevenson:

I think that we are scientists who are commenting on whether government builds or private industry does. I think we are really talking of subsidation in a different way. If you look—we are now subsidizing a prototype airplane. I don't think this is going to benefit the greatest majority of this country but this is one thing. We subsidize much of our air systems and we are now talking about subsidizing our railroads if we are going to have them survive. So, I don't think these subsidies are so far out of line. The question may be one of methodolgy, I don't think it means that government has to be letting the contracts, building the housing and so on. Certainly, government isn't doing this in the case of our airports, or our SST or other developments. So, this is really the aspect of it we ought to think of. We are not talking necessarily of government building all this. I don't believe this is the issue that has to be devolved here. I think we have certainly a faith in the ability of our private contingent to go ahead but maybe this is the stimulus that is needed to do it.

(Luncheon Break)

FOREIGN PANEL

Moderator: Dr. John Hanlon.*

Dr. Hanlon:

Ladies and gentlemen, it's a privilege to be here with you today. It is a privilege to serve as your moderator for this international panel. It consists of such distinguished participants that I am not going to take any time for extended comments except to begin the session with the brief and obvious statement that housing, dwelling, and protection from the elements represent one of the essential commonalities for all human beings as well as for the majority of other species that exist on the earth. Homo erectus rhodencica, as I recall the description, living about 75,000 years ago, apparently lived in social and to some extent physical circumstances not too different from ours although he was hardly a man.

I did a little homework for the assignment that I have today. Yesterday afternoon I went out to observe something I had intended to see for a long time. It is most dramatic and I wish everybody here could see it. In Poolsville, Maryland, Dr. John Calhoun of the National Institute of Mental Health has been carrying on long-term experiments or studies of the behavior of mice and rats under certain carefully controlled conditions. In a very provocative series of long-term studies, Dr. Calhoun has been able to illustrate in vivo the ultimate effects of uninhibited breeding and the results of excessive crowding. Given a healthy strain of laboratory animals, provided with constantly ample supplies of food, water, and nesting material, and unhampered opportunity to propogate in quarters carefully designed to be spacially adequate for 144 animals, well before reaching the eventual naturally imposed ceiling of about 2,500 animals, there develops a breakdown of practically all aspects of normal behavior. Laboratory mice are naturally clean about themselves and their environment. When limited in numbers they typically avoid soiling each other or their nesting places. Under the conditions allowed in these experiments, however, gross insanitation from bodily discharges becomes ubiquitous, and the tendency for personal grooming is lost. Usual territorial prerogatives become ignored. The strong attack the weak, and groups of the strong drive off groups of the weak. As a result, in each large experimental pen, masses of essentially outcasts which Calhoun refers to as "behavioral sinks" appear. The members of the outcast behavioral sinks become excessively violent, but only among themselves,—not with the strong overlords. Marked aggressive behavior appears among many of the females. Scattered throughout may be seen individuals who clearly demonstrate various signs and symptoms of regression, confusion and mental disturbance. Throughout, and even among the dominant animals, sexual desire and the ability to mate decline markedly. Homosexuality appears, with males trying to copulate with males, and females with females. Increasingly the group becomes non-productive. Such normal mating as does occur becomes increasingly infertile, such conceptions as do occur end increasingly in spontaneous abortions, such cubs as are born are typically premature and weak, and are typically ignored and cannibalized. Incidentally, it is of more than incidental consequence that once arriving at this state, removal of animals to more normal circumstances does not typically result in recovery. Permanent damage, probably resulting from endocrine, glandular and liver changes, appears to result from the cumulative stress of the situation.

One has only to read one's daily newspaper to recognize that a reasonable amount of interpolation from such studies to man, his numbers, concentration, living circumstances, and total environment seems valid. As mankind becomes overwhelminly numerous, his ever more densely crowded communities and the quality of his dwelling circumstances are certain to become ever more important.

---

* Deputy Administrator, Environmental Health Service

With that introduction to the subject of housing, crowding, and housing research, it is my privilege first to introduce Mr. Joseph N. Lanoix.

Mr. J. N. Lanoix:

Mr. Chairman, I would like to convey first to you and to my colleagues here the best wishes of the Director General of the World Health Organization, Dr. Candau, for the success of this meeting. As you know, on behalf of WHO I have presented a short paper which was distributed to you. To the original was attached a list of the main suggestions for housing research made to WHO by some of its expert committees and consultant groups. Our consultants had limited themselves to make recommendations only on what WHO itself could sponsor. I understand that some extra copies of this list are available for those interested.

WHO, as an international organization, is greatly interested in promoting national housing programs in all its member states. In line with its constitution and with established priorities in its total public health program, WHO's role is to stimulate in all countries an awareness of the need for early action in the hygiene of housing, and to assist member states upon request in establishing and developing programs aimed at the improvement of the hygienic quality of housing and of the residential environment.

We all know that in every nation, including the USA, as I said this morning, large numbers of dwellings fail to meet desirable or even the minimum human requirements listed by APHA's Committee on Housing and Health and by the WHO's Expert Committee on the Public Health Aspects of Housing. In addition to direct technical assistance and meetings, WHO's promotional activities include expert committee meetings, surveys, seminars, training courses, and publications. In view of the fact that the essential characteristics of national housing programs often vary from country to country, and between climatic regions of the same country, WHO has organized and in many instances it has participated in traveling seminars which enable responsible public health physicians, sanitary engineers, housing officials and physical planners to review and discuss information and technical data on relevant problems in other countries. Such seminars have been held with great success in recent years in the USSR, a country which during the last 14 years has been carrying out one of the largest housing programs in the world. The USSR is also a country where considerable attention is paid to health requirements in housing and physical planning and where health authorities have great powers of control over housing developments. In recent years, WHO has sponsored similar seminars in India and Venezuela and in 1971 it will hold a three-week training course on the public health aspects of housing and of city planning in cooperation with the government of Denmark in Copenhagen. WHO would be very glad to convene such traveling seminars and training courses also in the United States of America if proper invitations and arrangements could be worked out.

While WHO believes strongly in a multidisciplinary approach to the solution of housing and other environmental health problems, it also endorses the views expressed by an expert committee, according to which health agencies have a four-fold obligation. First, to assist physical and social planners in the development of plans for new or improved housing. Second, to assist in obtaining compliance with performance standards based upon minimum requirements. Third, to insure that housing, once it has been created, is adequately, safely and hygienically maintained and is occupied in accordance with the legal requirements of the area. And, fourthly, to review and evaluate housing conditions continually by collecting, maintaining, and analyzing data on housing quality. WHO is much concerned about the fact that in too many countries, in developing as well as developed nations, health authorities are either unaware of these obligations or tend to neglect them. Furthermore, these health authorities are seldom staffed or equipped to deal effectively with housing problems although they routinely issue pious recommendations of a general nature calling for housing improvement.

The second point which I would like to stress is that WHO believes strongly in the need for health research in housing and its environment, now. Within the past nine years WHO expert committees—three of them—one on public health aspects of housing, one on environmental health aspects of metropolitan planning and development, and a third one, chaired by Mr. Senn on appraisal of the hygienic quality of housing and its environment, plus one consultant group, made specific recommendations and gave detailed justifications for each of the subjects suggested for housing research.

In this field WHO objectives include any or all of the following: First, the support of collaborative research, especially research involving several institutions located in different countries and areas of the world. Second, a provision for services to research. Third, the training of research workers and Fourth, the improvement of communication between scientific workers. WHO, through its well designed and tested administrative mechanisms, its regional structure and its global membership is in an ideal position to stimulate and coordinate research studies and field investigations in the public health aspects of housing. In saying this, I had in mind not only basic research in the human requirements of housing, such as those involving the thermal environments, noise, lighting, size of the room, and safety, but I am thinking also of sociological and psychological investigations that are needed, of field studies on such subjects as statistical sampling and indicators in relation to appraisal programs and of demonstration and trial projects that can lead to specific advice on how government agencies may apply such principles and techniques of appraisals as those developed in 1967 by this expert committee on appraisal of hygienic quality of the housing.

To carry out its mission in health research in housing and its environment, WHO would have no difficulty in marshalling the active cooperation and participation of national health administrations and of their research institutes wherever these exist or are proposed for this purpose. It would also utilize the full capacity of its existing three research centers, or should I say, international reference centers, one on air pollution, one on community water supply, and one of waste disposal, for relevant studies. WHO also has at its disposal the free services of the members of its expert advisory panels on environmental health, experts who are scattered among countries around the world. Of course, WHO collaborates already closely on the subject of housing and physical planning with United Nations, with its Regional Economic Commissions, with the specialized agencies such as UNESCO, FAO, and a number of non-governmental organizations such as International Union of Local Authorities, International Federation for Housing and Planning, etc. all of which deal with housing and physical planning and urbanization, each one at its own speed.

Finally, WHO has always maintained the best relationship with the American Public Health Association and with similar national public health societies in the various countries of the world. With such associations WHO is also in an ideal position to foster collaborative research and to arrange for interchange of ideas and of research workers in science.

Mr. Chairman, I might sum up by stating simply that the World Health Organization wishes firstly, to stress here the value of health participation in planning housing programs, and secondly, to underline the importance at this time of more health research in housing and its environment. I might add a third point, WHO wishes to indicate its willingness and desire to collaborate with the American Public Health Association in the fields of health research in housing. I hope that this summary and these specific proposals will be of some value to the participants of this meeting. Thank you.

Mr. B. F. Reiner:

I would like first of all to take advantage of having the floor to comment briefly on some of the points which struck me in listening to the speakers this morning. I thought it was a pity, Mr. Chairman, that we cut off when we did before lunch. I thought we were discussing some very important issues, perhaps the most important issues which may not come up again in the working sessions. It isn't clear to me how "Operation Breakthrough", which I understand was essentially a campaign to promote more industrialized methods of building —how this by itself will produce the needed 26 million dwelling units. Then if we ever come to produce double our present capacity and maintain this level for a number of years —how we're really going to get those housing units to the people who need them most; and in doing so, how we are going to obtain balanced communities, whether from the economic, social or ethnical point of view. I think this is one of the most important issues in America today. Mr. Chairman, if we don't get back to that discussion and if it is not wrong for me as an invited guest to make the suggestion, this topic ought to feature in the conclusions on this week's discussions and be reflected in the health research recommendations.

May I next turn to another point. I understand that this conference is being sponsored by the American Public Health Association, in cooperation with HEW. It is clear, however, that many of the topics we are dealing with cut across functions of HUD, Interior and many other departments. I would hope therefore that your second conference would be jointly co-sponsored at least by HEW and HUD, and cover housing in a broader environmental prospective. And I would hope that again Mr. Senn would be a leading organizer of such a conference, at which I would again very much love to take part. I think there is something to be said for a wider spectrum for your next conference and if this is the concensus of participants here, such a thought might be included in the conclusions from the general debate.

Mr. Chairman, I was very much impressed with the broad perspective taken by the speakers this morning, in particular by Dr. Cornely. I found myself very much sharing his views. In the U.N. Economic Commission for Europe, we have started this wider approach to environment. We are challenging the "gross national product" as a sole measure of progress. We are suggesting rethinking the human price of unselective or uncontrolled economic growth. I would like to trace for a few moments this evolution in our work because I think it's so relevant to the meeting here.

I speak of the U.N. Economic Commission for Europe. It serves one of the most developed regions in the world. The USA, by the way, is also a member and so we represent a rather sophisticated part of the world. If I might say in brackets, it seems to me that the USA could usefully take a more active part in this work and pay much greater attention to the relevant experience of other countries. We Americans are so used to thinking that we are forever giving things away, especially to the developing countries, we are often in the posture of teaching but I think that at least in the field of housing and environment, the USA has at least as much to learn as to give. Perhaps one of the conclusions emerging from this international panel, this afternoon, would be to urge greater collaboration with other countries, in other words sharing ideas and research experience in the fields of housing and environment with countries outside of the USA through various machinery—such as the World Health Organization, the United Nations, including the Economic Commission for Europe, a number of other intergovernmental organizations, and many other bilateral and multilateral channels of collaboration.

Now I want to go back in the few minutes remaining to me to say something about the evolution of ECE's work on housing. It started some 15 years ago when it was confined to housing in the rather narrow concept of shelter, a roof over one's head. Discussion at the time evolved around poverty in terms of sub-standard housing or low-income housing and the somewhat narrower health problems such as daylight exposure, bathing facilities, kitchen equipment and security factors, including fire protection.

The discussions then broadened to include various physical design issues such as the layout of housing estates and neighborhoods. Housing problems began to be linked with urban physical planning. Demographic factors and land use developments were included in housing discussions. Furthermore, socio-economic considerations emerging from urbanization and industrialization entered into, and finally prevailed in our discussions. Very recently the scope has been further broadened to become a more comprehensive system of environmental planning in which a set of housing and planning issues play an essential part.

In this very brief talk, Mr. Chairman, I am not able to go more deeply into the work over the past 15 years but I would like to try and speculate a bit about the housing environment relations in the light of the ECE's experience. First of all, the housing problem has gained new spacial dimensions. While we are still very intensly interested in the micro level analysis of housing demand and supply, housing is now also considered an important component of the environment as a whole. Secondly, the interest in our work has shifted from the physical dwelling as the main object to the people who live in them as the real subjects of our study, for whom variation in housing and environmental quality cause various "costs and benefits". And, thirdly, we try increasingly to solve problems like urban renewal or community water supply, taking into consideration the manifold side effects (like the effects of urban renewal upon small business or upon underprivileged families) when considering alternative policies to pursue.

Thus, we are driven into dealing with systems approaches which require a large amount of theoretical, methodological and factual information. This development has some interesting consequences for our thinking. For instance, we used to deal solely with housing experts. In the light of the new systems approaches, the so-called all around housing expert tends to disappear and possibly even the know-it-all builder or architect. Secondly, the systems approach tends to overemphasize the need for central planning and we have to develop various devices where the individual citizen, the local authority and the group of concerned citizens have a chance and even a stimulus to come effectively into the game. I could imagine, Mr. Chairman, that the problem of citizen participation in a growing technocracy could keep us even more busy in the future than the problems of developing a perfect comprehensive machine to tell us the optimum solution to any problem.

And now, Mr. Chairman, my concluding remark to this meeting. While there may still be some dispute that housing quality in a narrow sense can affect physical and mental health or productivity, I am convinced that the quality of the environment as a whole is directly correlated with human well-being. The quality of the environment, of which housing is a significant component, is in many ways a reflection of the quality and health of our society. Thank you.

Dr. A. Edmund Martin:

Mr. Chairman, ladies and gentlemen, it has given me very great pleasure to come over here to learn something of your problems and to try to compare them with those which we are experiencing at present in Britain. The past ten years in Britain have been a period of great development in the social and governmental services. As a nation we attach great importance to local government, and health services, housing, and education are all essentially administered locally. The central government departments determine general policy and supervise the structure of the services whereas the detailed administration is left to the local authorities.

In the course of this talk I am going to spread my wings rather widely, not confining myself to housing but to tell you some of the prevailing trends which are affecting the environmental health services generally. Since the main administration is local, I'll begin with that first. At present, over the whole of the country with the exception of the larger cities there is a two-tier structure and we have over a thousand district authorities dealing with, amongst other things, environmental problems. These range in population from about 1,500 to over a million and each must have a medical officer of health and public health inspector. In order to have a corps of full-time public health medical officers the smaller individual authorities often share the services of one medical officer of health, sometimes between three or four authorities. Such a man will often be an officer also of the larger county authority, dealing with the personal health services such as maternal and child care work, within his area.

Medical officers of health in the local authorities have been in existence for over a hundred years. Over the years they have inaugurated many services; these have become more specialised and as a result there is a tendency to split off some into separate departments. Thus housing may now come under the supervision of an engineer or a surveyor, or more frequently under a Director of Housing. Water supplies also will be a separate department or authority and a separate Public Health Laboratory Service has been created, but the medical officer of health still has an overall responsibility for looking into any health problems which may arise.

Much of the routine work of food and sanitary supervision, is now done by the Public Health Inspector who is an expert in his own field and will very probably know more about some of the technical details than the Medical Officer of Health himself. And as time has gone on the Medical Officer of health has tended to concentrate more and more on the personal health services.

At the moment there is a lot of rethinking and replaning going on. Some of the essential points which are likely to be adopted are, first, that local government will be reorganized into much larger basic units. Instead of over a thousand local government areas, we shall probably have about 60 spread over the country with populations of from several hundred thousand to a million or more. In the great conurbations there will probably still be a two-tier administration but in the others it will be mainly one-tier except that there will be local subdivisions and area officers so that services are near to the people.

Alongside this local government structure it is planned that there will be a separate series of authorities dealing specifically with the health services. These authorities will be responsible for medical care and personal health services and will not be elected directly by the public but their members will be nominated. They will deal inter alia with the consultant, hospital, and family doctor services.

Now going from the local government organization the central government. In the days of old there were relatively few government departments. These proliferated and a few years ago probably reached their peak with a very large number of separate Ministries. They became so numerous that not every Minister in charge of a department could serve in the cabinet.

The original Ministry of Health was divided in 1949 and we had a new Ministry of Health dealing with the National Health Service, and a Ministry subsequently called Housing and Local Government responsible for local government administration and finance, housing, town and country planning, water supplies, air and water pollution and environmental health. On the medical side the distinction between the two Ministries was a fine one and difficulties were largely overcome by appointing medical staff from the Ministry of Health as part time advisers to Housing and Local Government. To quote an example, when I am considering bronchitis as a disease influenced by air pollution I speak as a Department (Ministry) of Health Officer but when I consider air pollution as a possible cause of illness I speak as a Housing and Local Government officer. Similarly I may ask a District MOH about the cause of an outbreak of typhoid and then change my hat and ask about the bacteriological quality of the water. On similar lines my colleagues and I also serve as medical advisers to the Ministry of Agriculture Fisheries & Food.

Our influence with the Ministry of Housing and Local Government depends I think very largely on the medical content of the particular subject. For instance, at the moment I would say our most important influence is on air pollution because the administration relies very much on our day-to-day advice on air pollution and practically nothing takes place without their consulting us and keeping us informed.

Similarly, on water pollution and water purity we have a very good relationship with the administrators and with the directorate of engineering. I have been serving as medical assessor on a working party on sewage and sewage effluents, dealing with the effectiveness of sewage treatment relating to pollution of rivers, estuaries, and of the sea.

A similar working party upon which I have been medical assessor has been working on problems of solid refuse disposal; a steering committee has just been set up on water quality and again one of my colleagues is serving on that committee.

On housing we haven't quite as close a liaison becouse there is not such a day-to-day medical content of the questions which crop up and it is very difficult, with our limited staffs, to keep in as close a contact as we would like. But where special problems arise they come and consult us as they did on housing standards. For instance, a paper which I published about 2 years ago on "Housing, Environment and Health" * was originally drawn up for the use of their Housing Standards Committee. In addition to advising Housing and Local Government we have unofficial links with the Ministry of Transport who come to consult us on health effects of petrol and diesel vehicle fumes. Also, we are consulted on emissions from power stations by what was the Ministry of Power but which is now part of the larger Ministry of Technology. The Ministry of Health has now been fused with another Ministry to form a large Department of Health and Social Security under a Secretary of State with two Ministers of State to assist him in guiding its affairs.

During the last few months there has been an increasing realization of the importance to be attached to environmental pollution. I think part of it is a spreadover from your great interest here in the States. A special Standing Royal Commission on Pollution has recently been established and held its first meeting a fortnight ago. This is an exceptional body since it holds its appointment directly from the Queen and is independent of the Civil Service. This will be looking at environmental pollution, generally. I am not yet quite sure how this will work with the existing governmental advisory servies but it is obvious there has got to be a close liaison for we already have committees such as the Interdepartmental Committee on Air Pollution Research, the Steering Committee on Water Quality, Clean Air Council and a Noise Council and the work of all of these will have to be coordinated with the Standing Royal Commission. In the non-medical sphere there has been concern over the difficulty of liaison between government departments so a small standing scientific body is being set up especially to supervise this particular aspect. Probably because of existing medical structure we shall remain outside this body but working alongside it, thus maintaining the continued liaison between departments.

There is one other aspect of these services which does cause me some concern and that is the public relations aspect. Over the last few months pollution has become such a common word and such a popular word that scarcely a day passes without a newspaper having some item dealing with it. There is a tendency for the reporters and journalists, also the commentators on television and radio, not being well informed themselves, to give very wrong impressions, thereby guiding the public into attaching importance to the lesser important aspects and neglecting perhaps the really important ones. In a relatively poor country such as ours, we have got to arrange an order of priorities to deal with the most important things first, leaving the lesser one to follow later. This illustrates the importance of proper public relations.

Mr. Gebremedhin:

Thank you, Mr. Chairman, I must express my pleasure at attending this meeting in place of Mr. Carlson. I was asked on very short notice to come here so I do not have a formal paper.

What I say will probably reflect my own views and interpretation of the role of the United Nations in the field of housing and urban development, particularly as this is related to the problems of health. Partly, this has been covered already by Mr. Lenoix, and Mr. Reiner—we are all part of the same family working generally in the same area. Perhaps our focus of attention at the Centre for Housing, Building and Planning where I work is a little bit more comprehensive, in that we attempt, so far as is possible, to integrate social development with economic development. In this context, it was very refreshing to hear Dr. Cornely's statement decrying the fact that there is much too much emphasis on economic development and the growth of the gross national product, and far too little attention on the question of social development. Part of the reason is clearly the fault, I think, of professional people who work in this area. There is, I think, a tendency for people working in social development to be somewhat vague.

On the other hand economists have spent a lot of time, and a lot of energy to try to work out a language for expressing their ideas so that there isn't much room left for misunderstanding. The same, I think, is not the case within the field of "social development". Especially is this true in the field of housing. Some housing experts spend too much time to convey a very dark picture of the situation in housing. This can't really help, especially the people who are interested in development. I think Mr. Turner, who is here, can speak much more eloquently about this question. There is a tendency to dwell too much on shortage, on the impossibility of narrowing tremendous gaps. I believe, it is not virtuous for an expert on the social aspects of housing, to go to a Minister of Housing of say, the Ivory Coast, or Nigeria or Ethiopia or Kenya to present an incredibly large figure as an indicator of the needs for housing. I recall the analogy of a doctor who runs to a patient to simply tell him: "You are really in bad shape! You are really sicn!" What good does it do? In our work we have attempted to go in a somewhat different direction.

Our attempts have been to try to identify successful experiences in social programs and to try to convey these to the countries that are struggling to build a successful housing program. Now I know it is not so easy to try to identify successful experiences, since these are subject to a wide variety of interpretations. But I think this approach holds much more hope than the constant prediction of an ever widening gap. We need to spend more time in trying to identify successful experiences, and successful strategies, to convey these to decision makers as evidence of how socially oriented housing programs can be effective. The work of the United Nations, today, in the social aspects of housing, consists of collecting successful experiences. In fact, the resolution passed by the Economic and Social Council, Resolution 1168, specifically requests the Secretary General to initiate studies of successful experiences in this field and to try to spread these to the countries which might find them useful.

Now, what would be the relationship of a meeting like this one with the work being done at the UN? I think the importance of this conference is that it represents a very rich field from which successful experiences in the social aspects of housing can be garnered. Such a group must be regarded as a very important source.

It is, of course, important to have clear criterias and some sort of evaluation, before deciding the process by which these experiences are to be presented and conveyed to the various countries for possible adoption. It is clear to me personally, that a successful experience is not necessarily a sophisticated experience. It is important, I think, to spend some time in trying to analyze and understand the way societies in the developing countries have been able to move as far as they have in meeting their own needs. Often I am very impressed to note how, in a simple way, social systems in Africa, succeed in providing excellent shelter for their members. I am also equally impressed, though saddened to note to what extent development has been used, particularly in the industrialized countries, simply to make things complicated.

I can't see, for example, all the benefits of having an automatic toothbrush except for those who make money out of selling it. It's important not to ignore the simple methods by which developing societies have attempted to provide themselves with the necessities of life. To the extent that this conference is able to provide a new climate of successful experiences in the social aspects of housing, I think a tremendous contribution will have been made. These should be conveyed to the developing countries with care, with great care, with great respect for what exists there.

I am very happy to be here and thank you very much, Mr. Chairman.

Dr. Arturo Berti:

Thank you, Mr. Chairman. I am going to talk in behalf of Mr. Quintana, Chief of the Division of Rural Housing and myself and, of course, on behalf of our organization. Venezuela has 352,000 square miles with a population today of 10 million inhabitants. It has a deficit of 800,000 houses and 250,000 rural houses are part of this deficit. In 1936, Venezuela had only a population of 4 million inhabitants. At that time malaria was between the second and third cause of death, with 7,000 deaths and about one million cases per year. Fortunately, today we don't have any deaths from malaria and very few cases. And I just have to talk on malaria because by the year 1958 malaria was practically wiped out of the country and so as public health workers we had to find something else to do.

And so we started to think of putting under control another very, very important rural entity, which is called down in the tropics, Chagas disease. We thought if we are to control Chagas disease we need new housing. The vector lives in cracks of mud housing and insecticides were not completely adequate to do the job of extermination. And so, in order to build suitable, sanitary rural houses we have to put water in them, and so we saw the need for a water supply program in rural areas, as well as in urban areas. For many reasons, we had to continue to use insecticides to secure some control because the rural housing deficit would be naturally slow to meet so we needed a large vector control program for applying insecticides and with the need for water supplies, housing, vector control, etc. what we needed was a big organization to take care of all environmental work in the country and it was decided to put the program at a high level, as high as the medical services of the country, within the Ministry of Public Health and Social Welfare. And so the Bureau of Malariologia and Environmental Sanitation was organized. Within this bureau we established a Division of Rural Housing and we established other divisions to carry on the other programs in connection with the total environmental sanitation program. For instance, we established also a division for rural water supply, a division for rural environmentalists to take care of Chagas disease, a division of hookworm disease which is a very important rural problem, and, of course, another division for the conventional activities of sanitary engineers.

And so we have the Bureau with several divisions. Of course we have to establish a school to teach and to train our staff and to recruit the highest levels for various professional positions.

We have within this organization a Division of Rural Housing organized under a comprehensive plan and which not only has to do with building of houses it also has to do with sanitary education to teach people how to use the new houses, some social guidance and other things in relationship to improved living conditions.

We felt that the rural housing program needed also to give some technical assistance to people who could afford to build their own houses. With the cooperation with the Institute of Education, so far we have trained about 6,000 rural builders to work with the program and to work with people on the program. I think that this feature has helped a lot.

From the standpoint of financing, we get two main budgets. We get funds from a housing bank which is an agency of the government in charge of the total housing problem, including urban housing. And we receive another part of our budget from the Ministry of Public Health and Social Welfare. So, from the money we get from the bank we buy materials, and pay skilled labor to build the houses of the peasants. From the money we get from the Ministry of Public Health and Social Welfare, we pay some professional, and what we call overhead, expenditures. What is charged to the peasants is only the actual cost of the houses, in other words, the cost of materials and cost of labor but not the overhead costs. We do believe that in order to provide these facilities to poor people out in the country we have to make some extensive social efforts. That's the reason why money comes from the Ministry of Public Health and Social Welfare. We consider it to be a duty of this Ministry to give assistance to these poor people who cannot yet afford to own this minimum type of house.

We also got some funds from the Inter-american Development Bank Loans and today the program is building 12,000 houses a year. The program has covered about 1500 communities. And since the program started in 1959, we have built over 80,000 rural units and 500,000 inhabitants are protected by those houses. This program has some features that may be of sufficient interest to mention here. For instance, one requirement is that the peasants must do some work in some kind of skilled labor. In the beginning we were very optimistic and thought that the peasants could work on in all the stages of house building by themselves. However, later on we realized that it was much cheaper to restrict such activities to only the semi-skilled labor, such as open ditches for foundations, painting the houses and leveling the land, and so forth, with the skilled labor provided and paid for by the program. And so we keep the people motivated; whereas one house took about a year to be built at the beginning of the program, now one house takes about one month to be built. And so we build an average, as I mentioned, of 1,000 houses a month. And this program has an impact on the rural economy by creating a lot of small businesses like cement block plants, and some plants for building furniture. After the people move into these new houses they start to buy.

To qualify for one of these loans it is necessary to comply with certain requirements. For instance, the minimum income is supposed to be $100 a month, and the maximum income is supposed to be $266 a month. The direct cost of house to be paid by the peasant is $1,200. No interest is charged the poorest people but all who can afford it are charged 3 or 4% of interest. Collections are made directly by people who receive 7 or 9% of the money collected.

I don't like to take too much of your time. We brought two papers. Some copies are available and from them you can learn more of the details. Thank you very much.

Professor Sven Thiberg:

I have been asked to say a few words on the global inquiry which we have done and which is published in the report, " Social Aspects of Housing and Urban Development" SIB Document 3:1969, Stockholm, Sweden. Some copies were brought here by the representative of the U.N.

But first I feel it nearly necessary to give a few comments on the topic of research, political goals and political power, if I have the opportunity: In Sweden, we think that you in America very often underestimate the problems of changing the actual direction in society. You talk of real political problems as if they were simple technical questions of space and shape. But in fact housing is mainly a political problem, a need for political will. You talk of altering social goals as if they were depending on information on new scientific research. In my opinion your need for a new housing policy is, in reality, a need for new, or refreshed, political and social priorities on a very elementary level. The question is, in the USA, as it was and as it still is, in Sweden —how to get the power of society to really work.

In this respect I want to read some lines from my paper. They seem today to be more relevant than I thought they were when I came here yesterday: "One of our main problems is to obtain respect for our most elementary pieces of information, by means of political and economic measures. If we can obtain this we will then have reason to further increase our knowledge. How are we to achieve such interplay between researchers and those responsibile for the community so that knowledge of man's needs and preferences can play a key role in the community's development? In some countries one comes to the conclusion that social scientific research must enter into the political debate on society and thereby become a real tool in the struggle toward the political goals. In Sweden, that opinion is achieving considerable support now."

Perhaps the problem in the USA, is that social research sometimes is in opposition to the policies of those in power, creating a barrier between researchers and politicians. If this is true, it may be an even more difficult dilemma to solve than that famous one faced by the first researcher in atomic power — how to prevent his knowledge from being used.

Our report, on international sociological research on housing contains nearly 1,300 references. That's a lot, and still it is rather disappointing, I think, from the viewpoint both of quantity and quality. I think it is only the very first step toward more sophisticated, and functional, and secure exchange of knowledge in our field. May I once again read a few lines from the draft of my paper for the conference: "The volume of research in the field covered by social sciences in planning is increasing very rapidly. The amount of data available is such that special steps must be taken if exchange of knowledge is to take place and if different users of research are to be able to find information relevant for them. Steps must be taken on several different levels. The goals of the international cooperation for the purpose of research, and reforms which should result from this cooperation, must be under constant review. Firstly, one should be aware of the practical difficulties involved in imperfect classification and documentation systems. Work on the questionnaire gave proof of this.

We have proposed that the project be continued with the development of a system for classification of data. This is, however, only the first step and I think that we have much other things to do now. The next stop should be to condense and compile available data in the form of reports which are more suited to the needs of the users of research. Even this is a matter of international responsibility. A priority is to ask international organizations to assist by distribution of condensed documentation or research. This, however, demands the support of both national research bodies and individual researchers, which we do not have today." I hope that this conference will deal with the research exchange problem in its final report in a very practical and an very active way.

HOME BUILDING INDUSTRY RESEARCH WITH EMPHASIS ON HUMAN RESPONSE TO RESIDENTIAL ACOUSTICAL ENVIRONMENT

(Summary)

Ralph J. Johnson *

Home building research is being conducted on many subjects by many different organizations. Most of this research is aimed at providing people with a better value dwelling, or one with new products, comforts, and conveniences. The significance of housing in modern society is attracting research efforts in the fields of economics, law, finance, sociology, medicine, etc., as well as in the more directly related areas of science and technology. The scope of housing research is illustrated by the area of interest of the various organizations performing the research.

Manufacturers of building products and materials are constantly performing research to develop new products that will obtain for them a greater share of the market. They also seek to develop entirely new products to help solve building problems or that will provide more comfort, convenience, lower maintenance, better function, etc.

Research conducted or sponsored by manufacturers' trade associations is usually concerned with standards for products or with improved applications or uses of the products.

Universities conduct research partly as a teaching function and partly to obtain new knowledge.

The Federal government conducts and sponsors a wide range of research pertaining to home building. One significant program is DHUD's "OPERATION BREAKTHROUGH" which is aimed at providing better value housing, in larger volume, primarily for lower income families.

The National Association of Home Builders, through its subsidiary, the NAHBS Research Foundation, Inc., conducts a wide variety of technological housing and home building research. They also conduct research in such related areas as land use, mortgage finance economics, and law. Virtually all of this research is aimed at improving the value of housing or obtaining fundamental information that will be useful in designing the dwelling to better serve the needs of the occupants. Very simply, this research can be divided into four general categories:

1) Materials utilization research aimed at providing adequate performance while reducing the amount of material used, wasted, or scrapped through structural studies, performance standards development, value engineering, field testing, and industrial engineering.

2) Productivity studies aimed at improving production and reducing manpower demand by developing methods and systems that will allow workmen to work smarter, not harder.

3) Design, development, and construction of Research Houses aimed at developing entire systems as well as products and methods that will help to expand the ability of the home building industry to better serve the Nation's housing needs in all price and income categories.

4) Research aimed at obtaining fundamental knowledge and information that can be used to improve value.

The Foundation also conducts a substantial volume of research, development and testing for the government, other trade associations, manufacturers, builders, architectural firms, and other clients.

Examples of the studies conducted by the National Association of Home Builders Research Foundation are too designed to determine the acousticalt environment in a typical apartment building and the occupants' reactions to that environment.* The components of this study are an analysis of the building's construction, taking of acoustical measurements, evaluation of the acoustical measurements, and the subjective response of the occupants. Specific acoustical performance of walls, floors, appliances, and equipment as built or installed was measured as well as background sound levels. Fundamental new knowledge was obtained on which construction advice could be given to builders to assist in improving acoustical performance. However, additional studies need to be undertaken to include other types of structures and construction, different acoustical environments, and various groups of people.

---

*Staff Vice President, NAHB Research Foundation, Inc.

---

*"Sound in Apartments." NAHB Research Foundation, Inc., Dec. 1965; "Field of Study of Residential Acoustics." NAHB Research Foundation, Inc., 1967.

CONFERENCE PAPERS

A. Mr. Charles Senn wrote a synthesis paper based on the position papers which was distributed to all conference attendees. The concluding section, Conclusions and Recommendations is reproduced in full.

B. Position and Supplementary papers were commissioned for use by the various workshops as appropriate. Abstracts of each are included.

C. Additional materials were contributed to some of the workshops. A listing of these appears on page 106.

Synthesis Paper *(Excerpt)*

EVALUATION, CONCLUSIONS AND RECOMMENDATIONS

by Charles L. Senn

We must deal with the collective effects of crowding, congestion and noise, considered in relationship to the total urban environment, as well as assessing each element as a separate entity. The broader area is necessary because stress induced by adverse environmental conditions is additive, to a considerable extent. Adverse effects of the size of large metropolitan areas are an integral part of the problems of individual residential environments.

For example, high density is one "answer" to urban sprawl. Heavy concentration of automotive traffic in and through large cities is a serious source of air and noise pollution in residential areas near such traffic arteries. Size and population of the community influence the volume of jet aircraft arriving and departing from an airport and affect community reaction to airport noise.

The stress of long trips on traffic-choked freeways and streets contributes to tensions which might otherwise be relatively easy to bear.

On the other hand, large metropolitan areas offer advantages of a wide variety of employment and business opportunities and cultural, educational, medical care, and entertainment opportunities in a variety and on a scale not possible in small communities.

Huge old, congested, and grossly substandard areas of the "inner city" are a problem of great magnitude for most large cities. Similarly, the problem of ghettos and segregation, coupled with the "flight to the suburbs", is a more serious problem for the large city. Solution of the problems of crowding, congestion, and noise in those areas of the larger cities should not begin with a view of the existing residential environment. Too much of the "solution" in the past has been to build large housing projects in the middle of the slum areas, a solution which did not face the core of the problem.

In-depth studies of the desirable and undesirable health effects of the "new town" movement in various parts of the world are needed. The desire for a home with a private yard and garden, which contributes to urban sprawl, might well be studied to ascertain the substitutes and "trade-offs" which might lead to acceptance of developments with higher densities and lower land and units costs.

A. *Additive Effects of Environmental Stress*

1. *Epidemiological Problems*

Combinations of human stresses, one-on-another, or "nesting" produce much more pronounced effects than any single stress acting alone. The effects of noise are intensified by exposure to other adverse environmental conditions, such as air pollution.

Eight million Americans have serious hearing impairment. Inability of many such persons to discriminate sound as to source may lead to withdrawal from society and may be a contributing factor to paranoia. Most studies of human subjects in this field have involved young, healthy college students and military personnel. Results might be markedly different if the subjects were selected from among the most susceptible members of society.

The additive effects of various factors are evident in certain case studies. A striking instance is the Public Health Service study of the Donora, Pennsylvania, air pollution tragedy. The first observation was that serious effects and death struck first those who already suffered from physical impairment. It also was noted that young people engaged in vigorous exercise and games were affected more than those less active. The truly discouraging point was that with all of the epidemiological, technical, medical, and postmortem resources assigned to the study, no

Preceding page blank

single contaminant was found in sufficient quantities to account for the observed effects. There is a probable parallel in the additive effects of environmental stress in the residential environment.

The amount of organized, planned scientific study conducted to date on the problems covered by this project has been grossly inadequate to establish a valid base for opinions on total combined health effects of obviously inadequate and adverse conditions of housing and its environment, which probably have significantly degrading effects on health.

2. *Cause-and-Effect*

Evidence of health effects of residential environmental factors is difficult to accumulate and gain acceptance slowly. When 10 percent of a population contracts typhoid from a polluted community water supply, the cause-and-effect is clear, since an identifiable agent is the known single cause. On the other hand, the slow acceptance of evidence linking heavy cigarette smoking with cancer and emphysema is an example of the difficulty encountered in proving illness caused by environmental factors.

Twenty-five years of investigation of the health effects of Los Angeles smog have failed to prove direct adverse health effects. We do not yet have evidence linking lung cancer or clearly attributing emphysema to smog. In spite of this lack of sufficient proof, a majority of the members of the medical profession and most citizens are convinced that smog is affecting health significantly and adversely. Any effort to link crowding, congestion and noise with clinical symptoms of clearly associated disease would be more difficult than either of the above illustrations.

Even to prove these is a link between delinquency and social problems and the residential environment is difficult. Recent work explored evidence of the effects of housing and its environment on social conditions, delinquency, and drug and alcohol addiction. As could be expected, data were produced linking a higher rate of those problems with substandard areas but—as in this project—not enough to distinguish among the large number of possible causes, of which housing and its environment is only one.

3. *Non-Communicable Disease Effects*

The ordinary citizen links many adverse health conditions with environmental causes. These include, to name only a few, heart and circulatory diseases, ulcers, various nervous disorders, headache, and insomnia. The assumptions may be valid. Some adverse effects of poor housing are easier to prove. For instance, recent studies showed a one-third higher home accident rate associated with slum housing. It would appear that further studies should be made in the area of non-infectious diseases and accidents.

Pending further study and research, it seems advisable to proceed, as indicated earlier, on the basis of evaluating in terms of "physical, mental and social well-being" and in the spirit of the Douglas Commission's goal of "quality cities".

A high degree of relationship between housing and social well-being is apparent. This association is well recognized by the Dutch, British, and Swedish housing experts who have social scientists as an integral part of their housing study teams and their standard-setting and design programs. They seem to assume we should learn people's likes and dislikes and then strive to produce conditions which satisfy most of the people.

A change in focus from "disease" to other housing-health relationship is indicated by the current draft of the APHA "Basic Principles of Healthful Housing". The Program Area Committee on Housing and Health found it difficult—and unnecessary—to distinguish between what, in the "Basic Principles", are:

> "Fundamental Physiological Needs ,and
> Fundamental Psychological Needs"

As a result, these groupings were combined under the heading "Human Needs". Another change was to drop the category, "Protection Against Contagious Disease". This was done on the grounds that adequate plumbing and water supply systems, food preparation facilities, rodent and vermin control, and other elements of a sanitary environment are of far greater public concern than the relatively rare cases of communicable disease which may occasionally be linked to unsanitary housing.

4. *Air Pollution*

Concentration of automotive traffic in certain urban districts and locating heavily traveled freeways next to residential developments are producing carbon monoxide and photochemical substances which may be a hazard to certain susceptibles. The problem warrants further study to determine the advisability of providing open space between freeways and housing and of placing more emphasis on non-air-polluting rapid transit rather than air-polluting automobile transportation.

B. *Assessing Human Needs and Wants*

Sociological studies of housing tend to include various inquiries to learn the views and attitudes of the occupants. Well-designed studies are necessary and should be continued and expanded. There are other means of collecting similiar information which have not been explored adequately. One such source is the marketing experience of the homebuilding industry. Another would be an in-depth study of the evolution of the modern, popular mobile home from its predecessor, the "house trailer". Such a study is recommended because it would tend to indicate desires and values. This is true because the mobile home has not yet been subject to normal building or housing codes in many communities and states. Changes, therefore, appear to reflect the desires of the purchasers, now so numerous as to be challenging the normal home building industry.

Our observations provide preliminary data on space and space separation desires of the purchasers of various vehicles, campers, travel trailers, and mobile homes. Hundreds of thousands of campers provide evidence that couples and families are content to spend weekends and vacations in a "use" and "space" crowded, single-room unit. The Pogrund paper observes that crowded space is acceptable for temporary occupancy. Mitchell points out that occupants of crowded quarters spend much time outdoors—certainly true of those who weekend and vacation in the country, forest, etc.

We use a 7 by 36 foot trailer which has a separate bedroom, complete bathroom, and a combination kitchen, dining, and living room. While it is comfortable and, in fact, seems spacious for temporary living, most persons who have visited in the unit agree it would be too small for a "home". That view is supported by the fact that most mobile home units now sold for "homes" are in the range of double 10 by 55-foot units, or 1,100 square feet. (This area happens to be the same as is used in the illustrations of the FHA "Land Use Intensity" in our position paper on "Congestion".) As indicated in that paper, we could learn much by judging the space allocation of mobile-home parks, partly controlled by laws in some states and communities, and more specifically established by owners and designers who are, in part, influenced by the profit motive. This type study would produce evidence useful in setting criteria for "planned unit" and other developments with shared open space and facilities.

Another suggestion is that comparative studies and opinion or attitude surveys be made to better assess human wants and needs in various developments occupied by persons and families of various ages, family composition, income, and avocations. Such studies should include those variables which are somewhat controversial. Among those are:

1. Space for light, sunlight, ventilation and view, for buildings of various heights.
2. Recreational facilities, their use and acceptability.
3. Desires for and appreciation of green space.
4. Noise levels (other than from human activity on the premises).
   a. In the areas adjoining living quarters;
   b. The upper limit of noise outside

windows and doors (both open and closed) when indoor noise levels for such sources are acceptable.

1. *Effect of Development Design on Segregation, Community Services, and Sprawl*

There are some who urge curbing trends which are producing urban sprawl—developments with areas of one-half acre or more per home. It is argued that this trend automatically excludes, on economic grounds, many minority groups. Some express concern because such development trends produce heavy loads, first on grade schools, then on high schools, at which time the grade schools may be under-used, etc. Some of these factors are health related, others probably not. It is recommended that more in-depth studies be made to assess the pros and cons of the traditional individual, single-family lot development, compared with well-planned multiple-family units and "planned unit developments".

2. *Transportation Systems and the Residential Environment*

This project did not specifically include aircraft noises in the residential environment but the public agitation, concern, and annoyance by constant exposure to jet aircraft noise is a major problem around airports, especially the busier ones. The shrill screech of the low-flying, approaching jet is not only disturbing, annoying and painful to the ears, but is a source of fear for some. The nature of the problem is indicated by the closing and abandonment of large, valuable public schools because of the combined effects of such noise and fear.

Almost equally disturbing is the roar of the power take-off of the jets. The answer does not appear to lie in sound-insulation of homes but in technological breakthroughs in noise source reduction, coupled with community planning and zoning to prevent creation of new residential developments near the flight paths of approaching and departing jet aircraft.

Truck, motorcycle, and general vehicle noise is a serious problem to those who live near heavy traffic arteries. It is considered essential that the first step be noise source reduction. It is common for noise from diesel trucks which meet California noise standards to reach 83 dBA at windows of apartment buildings which are at inadequate distances from freeways. In one study with the windows open, the interior noise was 73 dBA; closed tightly, the noise was 55 to 60 dBA. Goldsmith and Johnson indicate 36 dBA as the critical level concerning disturbance of sleep. It is apparent that the goal should be to reduce diesel truck noise by about 40 dBA. Exhaust noises are the loudest, but engine, air-intake, wind, and other noises are considerable. A first step should be to muffle the exhaust because this is simple and also because that noise is discharged so high above the road level that it is not possible to intercept the sound wave with barrier walls of practical height. Sound waves thus radiate to considerable distances. Other elements like motor, air intake, and tire noises then could be dealt with. That engine muffling is simple is demonstrated in European countries that enforce effective noise standards for bus and automobile engine muffling. A national and international standard on noise emissions from vehicles should be a companion project to standards on air pollution emissions from vehicles.

From a safety viewpoint, there should be more study of the Swedish and other planned new town patterns designed to keep vehicles from the residential areas and of U.S.S.R. plans to minimize automotive traffic in these areas.

C. *Health Implication of Adequate Dwelling Space*

The title of this section is borrowed from "Planning the Home for Occupancy". Both the Wilner-Baer and Grad-Hack position papers make frequent reference to the excellent data and analysis in the APHA study. In the 20 years since it was published, some new information has been obtained but there has been relatively little in-depth study of the health implications of space. The major change has been one of public attitude and social change. This is leading to a greater degree of acceptance by society of its responsibilities for helping people attain a living unit and residential environment compatible with a constantly rising standard of living.

1. *Infectious Diseases*

Some papers raise questions. One says, "Crowding obviously increases the danger of spreading communicable diseases . . ." Another stresses the importance of "personal space" compared with the surrounding "physical space". This concept, based on the "droplet" theory of infection, is well accepted. Over-occupancy increases the number of such contacts and of their duration. The de Groot position paper indicated that tuberculosis transmission is basically a function of the volume of contaminated air inspired. While it may be true that a specific volume of air contaminated with tubercle organisms must be inspired over a period of time to produce tuberculosis infection, there is logic in the assumption that the concentration of organisms per unit of air volume is also important. That concentration, in turn, is related to the room volume and ventilation rate (air changes per hour). It therefore appears that crowding is a factor related to the transmission of respiratory infection, although the cause-and-effect relationship is far less significant than has previously been assumed.

Crowding and "use crowding" by using kitchens for food preparation, laundry (especially baby's), child's play, and family activities must increase opportunities for transmission of infection.

Basically, while transmission of infection is not a major health concern with crowding, it is a factor which cannot be discounted.

2. *Mental Well-being*

"Planning the Home for Occupancy" makes repeated references to the association of crowding with "mental health". For instance, it is said, "Crowding . . . may produce nervous irritations, as detrimental to mental health as infections to physical health". Lemkau states, "Crowding makes irritations and interruptions inevitable, causing personal clashes which can grow into the deep seated repressed bitternesses that are conceded to be of importance in some mental diseases." He is convinced that crowding and its associated effects are associated with mental well-being and cites many illustrations which prove the point.

3. *Social Well-being*

"Planning the Home for Occupancy "says, "Since the family needs the dwelling as a refuge from the outside world, and since individual members need isolation, adequate dwelling space must give protection to the family from outside intrusion and to the individual members from the intrusion of the household itself." Reasons and arguments are given for providing space to separate the infant from the parents before its first birthday and to separate brothers and sisters at age 6.

A restudy of those questions by the present APHA Committee on Housing and Health revealed no evidence refuting the above advice. However, existing evidence on the adverse effects of not providing such separation was not considered adequate to take a strong stand on that issue.

The Mitchell studies in Hong Kong, like the Wilner studies in Baltimore, have provided sound sociological evidence to justify housing with suitable quality, space, and space separation. In fact, the sociological implications of housing and its environment are judged to be one of the clearest elements to link "housing quality" with "health".

4. *Space and Injury Prevention*

One of the most valid health arguments for proper "space and space separation" is found in the area of accident and injury prevention. This also is related to such factors as maintenance and lighting. Several authors stress the hazards which result from not having proper cabinets for safe storage of chemicals and potential poisons. Many reports indicate crowding does promote accidents and interferes with or discourages the neat and orderly housekeeping which is requisite to accident and injury prevention.

Baltimore studies showing one-third more accidents among slum dwellers than among those in acceptable housing provide a significant argument for acceptable housing and, indirectly, for adequate space and space separation.

5. *Space and Physiological Response*

Among the most important physiological responses to the indoor environment are those related to air "purity", temperature, relative humidity, air movement, and factors which affect thermal comfort. Room "volume" is not of major concern in relationship to ventilation since open windows or louvres and mechanical ventilation are of much more significance.

Although concern is expressed about slight increases above normal in carbon dioxide levels, data presented indicate that humans can tolerate 10 times as high a level as normal for at least 40 days without observable adverse effects.

6. *Space-saving Factors*

Floor area is a major factor in the cost of housing. Thus, there is much merit in developing housing standards and criteria which enable utilization of space-saving innovations as a means of providing healthful housing with a minimum of space and cost. The review draft of "Design and Construction Standards: Housing", under consideration by the Department of Housing and Urban Development, is a desirable step in that direction. Valuable lessons also can be learned about space-saving, built-in furniture, and public "wants" by a study of the experiences of the mobile home industry.

Built-in features are obviously important space and labor saving factors in kitchens, laundries, and bathrooms.

7. *Space Separation*

The question of space separation within the dwelling unit is so intimately related to personal attitudes and individual preferences that it cannot be settled on "health" grounds. Total space, not space separation, is the important factor in Hong Kong housing.

(a) *Bathrooms*

The one room which all seem to agree should provide privacy is the toilet-bathroom. In fact, housing codes such as the Uniform Housing Code, until recently, required that the bathroom be separated from the kitchen by at least two doors. That requirement was probably taken from restaurant codes which once contained such requirements probably because of the "miasma theory" of disease transmission. From a "social" viewpoint, if "two-door separation" is indicated at all, it might well be provided between bathrooms and living rooms.

(b) *Kitchens*

The kitchen was once separately enclosed, with a door, principally to keep heat and odors, smoke, steam, and vapors from the balance of the unit. Substitution of cooking equipment which does not heat the kitchen as excessively and provision of efficient local exhaust systems obviate this need and make possible, where desired, a design with open view and communication from the kitchen to living and dining areas.

(c) *Combination Sleeping-living Rooms*

A study of 42 "housing schemes" in England revealed a distinct preference for at least a two-room living unit, even for one person households. Most of the couples and half of the single person households occupied at least two rooms. Most who occupied one-room units would have preferred a two-room unit.

The study gave indications of attitudes toward space. The minimum acceptable size for a living room was 140 square feet and for a separate bedroom, 120 square feet. In fact, 83 percent were satisfied with bedrooms of 120 square feet. The study indicated special dissatisfaction with one-room units with less than 230 to 250 square feet of space, but the majority of such units contained only 160 to 180 square feet.

The report said, "Although some old people were able to combine living and sleeping successfully in one room, the addition of cooking was not liked. Those bed-sitting rooms which also contained unscreened kitchen equipment proved the least acceptable of all."

The Dutch housing appraisal standards classify a one-room dwelling unit for a couple as substandard, largely on the grounds that the sleep and rest of one occupant is disturbed when the other occupant is up and about.

An overall assessment of the evidence, considered along with the important question of economics, indicates that while one-room dwelling units are satisfactory for most couples for limited periods of occupancy they are not suitable for many couples as a permanent home.

D. *Summary and Conclusions on Space and Space Separation*

Within the context of the WHO definition of health, there is a wealth of information and data for formulation of certain goals and criteria concerning space and space separation within the living unit. The most forceful arguments in favor of adequate space and space separation are those which relate to social and mental well-being.

Undoubtedly a major share of the nation's effort toward achieving a "quality environment" and solving the problems of the slums, ghettos, and the inner city must be devoted to improving the quality of the residential environment, along with the many other relevant features of such programs as "Model Cities". The position papers indicate that the effect of crowding begins with the infant which must be housed in the bedroom of its parents.

Safety and well-being of small children depend upon their having safe and suitable indoor space for play. As children grow, evidence indicates, it should be possible for boys and girls to occupy separate bedrooms. Ample evidence is available to completely discard the concept of children counting as "one-half person" in computing space. Importance of children having a place to study, read, engage in hobbies, relax, and have "individual space" is stressed.

"Use overcrowding," or use of rooms and space for several different and non-compatible purposes, is recognized as a major undesirable form of crowding. The evidence is clear that for most people, sleeping quarters should be separated from other living quarters. Several papers recognize the increased demands being placed upon space in the residence. One example is television, which necessitates some degree of both visual and auditory privacy. At the same time, some of the unit's occupants may wish to converse, study, talk on the telephone, listen to radio, read, etc. As man acquires and utilizes more and more appliances and conveniences he needs both more space and more space separation.

While more study is needed to produce quantitative and qualitative data, position paper statements indicate lack of a suitable, quiet, private area in the home for study may destroy the desire and motivation for study of many young people in the slums and ghettos. It is assumed this contributes to the "dropout" rate and then indirectly to social, educational, and economic problems.

The concept of the home as a sanctuary, refuge, and place of rest and relaxation, coupled with its role as a social bond toward family unit and social activity, is related to space and space separation. In the past, housing codes were principally concerned with minimum space in sleeping rooms. It is believed that space for other household activities is of greater importance but has received too little attention.

Conviction is expressed that courts will support housing standards based upon the type evidence developed in the position papers. Analysis of building codes shows the serious adverse effects of dominance of building code drafting committees by persons concerned with construction and fire safety and the lack of a strong voice for standards which are based on health considerations.

No attempt is made to quantify space and space separation in terms of dimensions. Such data are provided but admittedly not based upon the in-depth study which this important subject would warrant.

RECOMMENDATION NUMBER 1

That this project be extended beyond "establishing limits of human tolerance" and produce in-depth data to provide a scientific basis for establishing guides and criteria concerning space and space separation needs of dwelling units and homes of varied family composition. In doing so, the APHA publication, "Planning the Home for Occupancy", and data from this project would be utilized in conjunction with the concepts utilized by Housing and Urban Development in developing space requirements in their review draft of "Design and Construction Standards: Housing". Also, as mentioned earlier, full use would be made of experiences of the mobile home and home building industries.

E. *Density and Congestion in the Residential Environment*

Just as "Planning the Home for Occupancy" was a "starting point" for assessing the health effects of space in the living unit, "Planning the Neighborhood" was utilized in considering the spatial requirements of the residential environment. Space requirements produced by utilizing FHA's "Land Use Intensity" charts were surprisingly similar to those recommended in "Planning the Neighborhood".

One of the most striking conclusions from the study was the lack of both scientific data concerning environmental space, density, and amenities and the lack of definite guides, criteria, and standards in this field.

Authors of position papers repeatedly state that the surrounding environment is really a vital element of housing quality. The neighborhood can be more important than the dwelling unit. Tensions from crowded housing quarters are relieved by going outdoors, hopefully to a suitable residential environment.

Evidence is presented to indicate that density, per se, is not a vital factor. However, several different authorities, applying different methods, arrive at similar upper limits to the number of families which can be healthfully housed on an acre of land.

Grounds are stated for carefully considering characteristics of occupants of large, dense housing areas when planning the environmental space and facilities and providing guidance and leadership for children and adolescent activities.

Design and arrangement of means of circulation and communication should be developed in recognition of the fact that inadequate inter-personal and social contacts among residents can be as undesirable as "too much congestion".

1. *Space for Light and Ventilation*

One important factor in space allocation is orientation, design, spacing, and arrangement of buildings to admit daylight and, when desired, sunlight, to afford ventilation and provide a pleasant view. Achieving such goals in existing, densely developed areas is difficult, if not impossible. The question is raised: "To what extent can and should air conditioning and artificial illumination be substituted for windows and outdoor space?"

The present answer seems to be that most persons and families appreciate daylight, sunlight, a view, a chance to observe the weather, and an opportunity to admit "fresh air". It is concluded therefore, that housing and environmental design controls should provide space for these purposes. There is merit, however, in a somewhat detailed study to assess this question of acceptance by some of an "artificial" environment. While many would strongly object to being "forced" to live in windowless apartments and rooms, there may be significant numbers of others who would be quite contented in such quarters.

RECOMMENDATION NUMBER 2

Beginning with the recommendations developed by the studies for the Environmental Control Administration by Profs. Anatole Solow and Ira Robinson, and utilizing data from this project, a completely new substitute for "Planning the Neighborhood" should be developed. It would not be a quantifying "handbook" of design but would provide the best available data for use in designing developments of various densities and types, with due consideration to the great variability in desires and needs of different types and ages of occupants.

In view of the relevancy of the need for integration (or less complete segregation) of economic and ethnic groups, the project would study the subject in some depth to show how to design and arrange so the result is acceptable to all proposed occupancy groups.

Such a study would include in-depth involvement and utilization of many disciplines. These would include:

(a) Traffic authorities;

(b) Park, recreation, playground and landscape architect specialists;

(c) Sociologists and specialists in activities, habits, and characteristics of children and adolescents;

(d) Noise and acoustical authorities for both exterior environment and interior design and arrangement characteristics;

(e) Air pollution, ventilating and lighting specialists to assist in assessing elements such as automotive generated air pollution and its effects on residents, exterior lighting to promote outdoor, evening activity and promote safety, and ventilating, air conditioning and indoor "air purification", to minimize adverse effects of noise, pollution, and congestion, with particular emphasis on those who are most susceptible.

The proposed study, with emphasis on health as broadly defined, would include as a major objective consideration of the "Land Use Intensity" and "Planned Unit Development" concept. The study would, among other goals, focus on the elements in design of premises with shared outdoor and "common" space.

F. *Noise Control Within the Building and Unit*

Enough of the literature on noise has been analyzed to arrive at certain definite conclusions. Studies on procedures for attenuating noise transmission through walls and floor-ceiling combinations; for reducing noises generated by equipment in buildings and its transmission by both structure and airborne routes, are comprehensive. A wealth of data is available, but none is considered in sufficient depth in one area. There is not enough focus on the results of recommended noise control construction and techinques, in terms of the effect on the occupants presumably benefited by such improvements.

With communities like New York City requiring walls with a sound transmission class of 45 and establishing very specific criteria for noise control for equipment, it is essential that the results of the new code be carefully and scientifically evaluated in terms of acceptability to residents of various types. The STC of 45, which is temporary, should be compared with the level of 50 proposed for later and now accepted in some European countries and elsewhere.

RECOMMENDATION NUMBER 3

A major health-noise study is justified. This should be done in collaboration with those already conducting research, studies, and development programs, especially the Department of Housing and Urban Development, Department of Transportation, and Department of Commerce.

The focus would be to utilize the most effective means available and the most knowledgeable research design specialists to more adequately determine human response to noise; to utilize the vast amount of information already available to measure noise; to evaluate various existing cases, criteria, standards, and techniques to develop comparative data as a basis for establishing criteria for such elements as:

(a) Noise source reduction;

(b) Distance as a noise attenuating factor;

(c) Noise barriers and "absorbers";

(d) STC's of various levels for various separating walls and ceilings and for various wall and window combinations;

(e) A comprehensive *health* study of the effects of aircraft noise and noise-induced fear to form the basis for locating, enlarging, and possible abandonment of airports with heavy jet traffic; or provide design criteria and goals for the national effort toward developing more quiet and yet sufficient sources of power.

ABSTRACTS OF PAPERS

MODULAR HOUSING REGULATION PROBLEMS, OBJECTIVES AND TECHNIQUES

by Frederick H. Bair, Jr.

This paper discusses control problems created by the sudden emergence of modular housing and proposes adaptation of some available regulatory techniques and needed regulatory refinements and reorganization. The need for low-cost housing is creating growing dissatisfaction with local controls which raise cost or inhibit use of modular dwellings with high consumer acceptance.

Problems are: the plethora of codes and regulations; the use of codes for exclusionary purposes; and controls which effectively make housing more expensive, partly for tax reasons, partly as a means for economic segregation and partly on behalf of special interest groups profiting from excessive requirements.

Currently definitions of mobile homes and modular dwellings are changing, though there are many similarities between the two. The differences, at least in appearance, will probably increase rapidly because of aesthetic prejudices against anything looking like the typical mobile home appearing in conventional subdivisions. The definition of mobile home parks is also changing and creating new problems of design and location.

Regulatory objectives concerning mobile homes and modular units should be the same as for other forms of housing—i.e., to insure safety, health, comfort, light and air, a decent environment, and so on. Exclusionary zoning has resulted in mobile home parks being barred from certain communities or limited to areas ill-adapted to residential use.

State regulation of mobile home parks has the advantage that substandard facilities cannot develop in local areas having weak regulations or none at all. However, reliance on state regulation would be premature in states where controls have not been modernized. The U.S. Public Health Service has model codes which can be adopted for this purpose. Further, state construction codes, inspection and certification are more suitable than local controls since units are delivered complete.

Zoning for mobile homes should consider the blighting influence of non-residential neighborhoods, the separation of travel trailer parks from mobile home parks, appropriate buffering requirements, density limitations, and requirements for recreation facilities and common open spaces. In some neighborhoods of conventional single-family residences, if mobile homes are to be permitted to intermingle it may be necessary to require appearance similar to conventional dwellings. While such guidelines may appear inequitable, they are necessary not only to protect existing property values but to create wider acceptance of this economical form of housing.

Because of unit shape, subdivision regulation for characteristics for mobile or modular homes or townhouses needs to be different from that for conventional dwellings. The problem of density control can be rather easily handled by requiring a proportionately larger amount of common open space. Many specific code problems can be eliminated by comprehensive planned development regulation which results in techniques better related to achievement of public objectives.

Basic problems are caused by codes which have been cumulative, imitative and insulated; and to make matters worse, enabling legislation or charter provisions sometimes institutionalize these shortcomings. Further, regulations from outside the local jurisdictions have multiplied. Controls in neighboring jurisdictions often vary needlessly and controls may have lost proper relationship to public purpose.

This paper concludes with some general suggestions for regulatory reform. "*Vertical*"

Preceding page blank

coordination would apply federal, state or county controls to local areas. "*Horizontal*" *coordination* would assure that the various local codes did not conflict in objectives or effect.

Reorganization and improvement of substantive provisions (standards) should eliminate from local controls provisions found to be exercised adequately by higher governments, determine where controls to meet specific purposes belong in the regulatory system and reassemble standards in a usable, cross-referenced form.

WHAT ECONOMISTS THINK OF HOUSING AND HEALTH

by Leland S. Burns and Frank G. Mittelbach

What can economists contribute to the very timely question of improving environmental quality—particularly, the micro-environment of the home? For several years, with the generous support of the Agency for International Development and the U. S. Public Health Service, a group of UCLA economists, organized as the International Housing Productivity Study, have been concerned with just this issue and ways economic analysis can be applied to the really tough question of the residential environment. The paper presents research results and some conclusions drawn from case studies involving evidence on nearly 2,000 persons. It deals with the complexities of relationships linking improved housing, as a causal input, with socially desirable outputs.

As a first generalization, it has been concluded that qualitative improvements in housing seldom produce dramatic benefits for the rehoused. Contrary to expectations, rates of utilization for medical services appeared relatively insensitive to changes in the quality of the residential environment. For education, it was found that school attendance rates were only marginally affected following relocation in improved housing. Similarly, for employment, the research concluded that work absenteeism responds marginally to housing improvement, but sometimes in unexpected ways. In some cases absences actually increased immediately following rehousing, as workers apparently discovered that their services were more valued in the household than at work. The results should not be interpreted as damaging to the case for better housing. They do suggest, however, that we may expect too much from strictly physical changes in the environment.

Two other considerations emerge as immediately relevant. First, the level of development at which we interject new housing may determine the magnitude of benefits generated. Second, as a corollary, marginal improvements in housing quality may generate more substantial health effects than quantum improvement. We have noted that housing projects built for the very poorest tended to produce (but not invariably) the most beneficial results. This is as economic theory would predict. At higher levels of development, the returns per dollar invested converge on zero. In economically advanced areas, health care is often excellent and resources can be devoted to finding cures for the diseases of the rich; in developing areas, health problems are more basic; they concern delivering potable water, eliminating vermin, and insuring that most have at least minimal diets. Over the last century it has been noted that reductions in serious malnutrition and improvements in social and medical services have reduced the probability that families would be particularly liable to suffer from the effects of overcrowding and poor-quality housing. Hence, in the past the highest health pay-offs have been obtained from investments in medical technology, whereas, the pay-off from environmental investments has been somewhat disappointing.

At another level, if some particular component of poor housing is found to contribute to ill health, the elimination of the deleterious condition may improve welfare of a large number of people as contrasted to completely rehousing a select few. In other words, populations may be housed in overcrowded shacks or central-city slums, but if the attendant utilities and community facilities are of reasonably good quality, the likelihood of massive epidemics or generally poor health can be minimized.

This leads to the second point which is corollary to the above. The point is this: that the American tradition of building only the biggest and the best may be wrong. Implicit in our housing policy has been the notion that new dwellings solve the housing and health problems; tear-down-and-rebuild has been a prominent solution. One reason why our benefit-cost calculations fail to show a reasonable return to housing investment, even when the broad complement of benefits is monetized in terms commensurable with costs, is that costs are too high. Clearly, not all parts of a new dwelling unit are health producing and not all parts of a standard unit are disease producing. At several sites studied, comprehensive inventories of old (before) and new (after) were taken, and comparisons were made of changes in detailed characteristics to change in health. The strongest conclusion was that the removal of rat infestation produced the most marked reductions in utilization rates. Contrary to expectations, far less important were the more customary inputs of space consumption per person and plumbing facilities; and as noted, overall change in housing quality had a dubious impact.

Housing policy should concentrate on maximizing welfare for given limited resources rather than minimizing the cost of reaching given, impossibly high goals. Under these restrictions, a new definition is clearly needed of what constitutes "acceptable" housing quality. Perhaps more attention should be given the notion of "second-best" alternatives in housing. Devices familiar in developing countries, such as roof loans, core housing, sewerage and street lighting and so-called "planned slums" are examples of incremental, low cost methods of changing housing quality. Relative to changes in the total housing unit, each of these incremental changes may have positive pay-offs in the form of improved health.

It may be argued that, in one form or another, some tangible and often measurable, results will be associated with an improved living environment. These results are expressed in a variety of ways—family or neighborhood relationships, physical or mental health, performance on the job or in schools, changed consumption patterns, participation in community affairs and so on. Perhaps the outputs cannot all be "monetized" or placed on some other common scale at this time, but in qualitative terms at least they can be compared to alternative uses of the resources. However, as we enter the more elusive area of "pleasant and suitable housing," it might be well to reflect on a principle very familiar to economists. That is, the marginal value of an additional increment of housing will be considerably smaller when basic shelter quality is sound as compared to when it is unsound.

Economists are concerned with using resources in the best way possible. They become not unduly concerned when housing codes, building codes and other housing requirements increase the cost of housing without pay-off and, simultaneously, make less available to others, or when housing advocates preempt resources for housing programs without concern for the urgency of other necessary programs.

HUMAN HEALTH AND THE SPATIAL ENVIRONMENT

by Ido de Groot, M.P.H.,
Robert S. Carroll, Ph.D.,
Ray M. Whitman, M.D.

This paper describes various aspects of health as they relate to and are affected by the spatial environment. Since man is a space-occupying reality, all of his existence in terms of behaviors and actions has spatial-temporal aspects. In considering man's life-space there is an unfortunate tendency to restrict attention to lack of space, based primarily on the concern that "crowding" results both in transmission of disease and "stimulus-overload". This is a restrictive view in that it is difficult to correlate infectious problems to specific densities while "stimulus-deprivation" can result from too much space.

Any measure of population size or type is referrable ultimately to a "density" statement; the three major items contained by this variable are implicitly number, area and time. As populations increase there is increased association, cosmopolitanism, role speciation, diversity of behavior, etc. that results in a relative increase in crowding of both people and behavior-activities. Increments of space-occupying behaviors can occur independent of increases in the number of people utilizing a given space. For this reason crowding of activities is, but crowding of people per se is not, a meaningful concept when considering space and health.

Epidemiological studies are seldom undertaken to assess the incidence or prevalence of a disease in order to evaluate density. On the contrary, relative degrees and types of density are scrutinized for their possible value in explaining some specific disease-phenomenon.

Such diseases as cholera, yellow fever and plague respond to the sanitary engineering concept of separation of non human hosts (rodents, lice, water, food) from humans. However, other diseases require primarily behavioral intervention. Lack of space has always been considered to relate directly to disease-outcomes particularly in justifying the importance of living space, but this belief cannot be validated. While there is a correlation between raw density and morbidity/mortality rates, when education and income are controlled for the correlations drop almost to zero.

It is even more difficult to establish a direct relationship between space and non-infectious disease since here one is not even dealing with a live pathogen. Individual behaviors such as smoking, dietary intake, exercise, rest and work are now the more potent influences on disease outcome of human behavior.

As American family patterns change, there are concomitant changes in space usage. For one thing, families tend to be smaller but each person participates in more individual and group activities, and there are more activities which take place in the home. Further, because of the increase in working housewives, there is in effect behavioral crowding. While the working woman performs no more household functions than the non-worker, they are performed in identical space over collapsed time.

In terms of space considerations, knowledge about accidents appears uniquely pertinent, most importantly because it allows the taking into consideration of what is in the residential space, how it is utilized, when and by whom.

It is difficult to specifically relate the spatial environment directly to mental health. However, studies lead to the general conclusion that environmental variables are at least precursors of mental disorders. Ecological clusters of disease and concomitant clusters of socio-cultural variables can be observed in time and space.

Man's own definition of space is based on three points of view: that man has basic physiological space requirements, that man receives via his senses physical, mechanical, chemical and symbolic information about his surroundings; and lastly, that he has his own time-specific, role-specific reaction to space. This latter is currently referred to as the concept of territoriality. An individual's territory can be encroached upon by such things as odors, noise, and loss of employment as well as actual physical intrusion or crowding.

The most significant monitor of housing quality is simply the satisfaction and contentment of the occupant. In special settings such as occupational environments, schools, barracks, submarines, planes and space vehicles much research has led to designs which allow the occupants to perform their activities in comfort and comparative safety. However, the home, which is the most crucial environment.

seems the least understood. This is at least partly due to the sheer range and categories of behaviors which take place within the home.

It is unlikely that these complex interactions of biological, psycho-dynamic, social, psychological and socio-political actions will soon be unravelled. The immediate health goal, therefore, must be to make the consumer a participant in environmental design and to create flexible multi-use designs.

EFFECTS OF NOISE ON HEALTH IN THE RESIDENTIAL AND URBAN ENVIRONMENT

by John R. Goldsmith, M.D.,
Erland Jonsson, Ph.D.

Noise is unwanted sound which produces unwanted effects. It can produce effects which simulate or aggravate disease. It can produce impairment of function, interference with activities, and of sleep, feelings of annoyance, and social and behavioral as well as physiologic reactions.

While there is no doubt that noise can affect health, there is no adequate evidence that noise exposures cause specific disease other than those associated with hearing loss.

We believe that with additional study and analysis is it possible to establish, on a scientific basis, the relationships between noise exposures for the general community and a series of health effects as follows:

1. The relation of long-term community noise exposure in the permanent loss of hearing.

2. Reversible impairment of hearing associated with temporary threshold shift.

3. The impairment by external noise of communications, particularly conversation, particularly among people who have some hearing impairment already. For example, at a noise background defined by the speech interference level (SIL) at 45 decibels, relaxed conversation can be carried out with normal hearing and normal voice at distances up to 10 feet. When speech interference level increases to 55 decibels effective communication distance as above is decreased to 3 feet. There are, however, no specific data of this sort for interference with speech in persons who have deficient hearing.

4. The production of physical symptoms or physiologic changes particularly in the vascular system. It has, for example, been shown in a single experiment, that pulse amplitudes increase significantly with 80 decibels noise backgrounds, but do not with 65 decibel noise backgrounds. It has been suggested that above 60 decibels there may be autonomic changes. This is buttressed by the survey findings that symptoms of headache and nervousness are increased with noise levels in the community in excess of 50 dBa based on a 24 hour average.

5. The effects of noise on sleep are well known, but not well quantified. This effect has been used to suggest a 35 decibel background noise level at night in residential areas except for occasional sounds up to 45 dBa and rare peaks of 55 dBa. Ten decibels higher is acceptable for most persons for most daytime household activities.

6. Annoyance reactions occur in residential areas when the average noise exposure exceeds 50 dBa.

Of great importance would be the conduct of prospective epidemiologic studies in populations with different average noise exposures in order to document better the prediction that community noise exposures above 50 dBa will have an effect on hearing which is roughly proportional to the noise intensity and the duration of exposure.

The adaptation to noise and the uses of masking noise need to be studied more intensively, as do the physiologic reactions to noise and the extent to which annoyance reactions occur among different populations with different noise exposures.

We believe the evidence strongly supports the finding that noise exposures in urban areas throughout the world appear to have been increasing, are reasonably amenable to control, and are producing health effects which are of substantial importance.

We recommend that community noise levels be set based on exposure reaction data which is scientifically valid and that sound transmission levels be set within buildings so that acceptable acoustical environments can be assured to every sector of the population.

THE REGULATION OF OCCUPANCY, NOISE AND ENVIRONMENTAL CONGESTION: SELECTED LEGAL ASPECTS

by Frank P. Grad and John D. Hack

An analysis of governmental regulation of occupancy, noise and environmental congestion reaches the conclusion that there are few if any constitutional or legal obstacles to the imposition of sound, technically advanced standards if such standards can be based on scientific or other expert conclusions supporting their reasonableness, and they can be related to the protection and advancement of public health, broadly defined.

The work reviews the available sources of law and regulations in the field, and finds that a broad variety of laws and regulations—including housing codes, building codes, zoning ordinances, as well as general state laws delegating authority to health and housing agencies to set standards—are relevant to a consideration of the subject. Reviewing constitutional limits on housing and space regulations, the authors conclude that the only real limits on the states' and localities' police power to deal with the subject are set by the requirements of due process of law (which requires that regulations be procedurally sound and reasonably designed to accomplish their objects without causing undue hardship), and by the equal protection clause (which protects against discriminatory regulation and unreasonable classifications of the objects of regulation here involved). Generally, in arriving at constitutional judgments whether a regulation is reasonable or whether its classifications are discriminatory, courts are strongly guided by the technically expert judgment of regulatory agencies unless the regulatory agency can clearly be shown to have been wrong. Other challenges to the legality of housing regulations—including the assertion that the delegation of standard-setting to a health or housing agency is an improper delegation of legislative power, or the assertion that a change of standards is an "*ex post facto*" law, retroactive in effect because it renders illegal housing conditions which have previously been considered legal—have generally been dismissed by the courts.

A review of occupancy and room size standards from the early tenement house laws to the present, including room size standards proposed under the leading model codes, finds that minimum standards have hardly changed and that there has been very little progress in the past seventy years. A historical review of occupancy standards and light and ventilation standards leads to the conclusion that standards in the law often reflect little more than available arrangements in the existing housing inventory.

An analysis of different methods of measurement of habitable space and of space separation requirements and room size requirements for non-sleeping rooms shows that many of the legal standards reflect the accepted general value judgments and middle-class expectations with respect to decent accommodations held at the time the standards were imposed, rather than scientific judgment. Nevertheless, the courts have generally accepted the standards on the assumption, and the expert assertion, that they advanced the public health.

It is very difficult to enforce occupancy standards, and there is some question whether in a strict sense they are enforceable at all. It is suggested that occupancy standards have never been challenged simply because they have never been seriously enforced. As Veiller already recognized at the turn of the century, to enforce occupancy standards or to enforce the requirement that kitchens and other non-sleeping rooms not be used for sleeping purposes would require bed checks at night, which are not only legally and administratively impossible, but also abhorrent. The suggestion is made, however, that though difficult to enforce, occupancy standards have their positive uses as a statement of the kind of accommodations families are entitled to, as minimum aspirations that the law ensures. Occupancy standards tell the slum dweller who lives in overcrowded conditions how much space he ought to demand if decent housing is to be viewed as a service or utility to which every citizen is entitled.

With respect to noise control, attention is drawn to the circumstance that noise control has become an active concern of government ever since a politically knowledgeable group has become victimized by the problem. Aside from its seriously disturbing nature, jet plane noise is of particular annoyance to suburbanites whose affluent homes are located in the vicinity of airports, i.e., a group that can exercise political pressures far more effectively than slum dwellers. The legal basis for noise control is clearly found in public health in that noise demonstrably affects not only physical and emotional well-being but also can be shown to have a measurable result in hearing loss. The history of noise control, from the diverse and generally spotty municipal anti-noise legislation against unnecessary sounding of bells, horns, loudspeakers, and other aural nuisances, to more sophisticated legislation of recent date, is reviewed. Particular attention is paid to recent provisions in the New York City Building Code and in the New Jersey Regulations for the Construction and Maintenance of Hotels and Multiple Dwellings, which require acoustic controls in new construction so as to shield not only against noises from outside the building and from different dwelling units within the building, but also against noise originating from the equipment—such as elevators, heating and cooling ducts and other vibration-producing machinery—that are built into the structure itself.

In reviewing the problem of congestion in the environment, the obstacles posed by fragmented and overlapping jurisdictions in metropolitan areas on the government's capacity to engage in sound planning and controlled development is noted. The examination of the nature of housing density regulations concludes that control of density alone is not, by itself, adequate to assure desirable urban development, but that with respect to private development activities, governmental controls of a most extensive kind are necessary to assure the creation of viable communities for the future. A uniquely comprehensive range of regulations is necessary, because the private developer in the very real sense creates and influences the geography and the ecology of the community for a considerable time to come—and matters of such major impact cannot be left to private judgments alone. After examining the need for regulatory power in this area, it is concluded that there is adequate constitutional authority for such broad regulations. Indeed, in the context of neighborhood density controls, zoning and subdivision regulations, and particularly in instances of the regulation of subdivision development and redevelopment, the exercise of the broad powers called for by the Federal, State and local governments has generally been upheld. The exercise of such powers has been upheld as protecting and advancing the public health, newly defined to include elements of comfort, well-being, aesthetic values and other elements to contribute to the quality of life.

MENTAL HEALTH AND HOUSING

by Paul V. Lemkau, M.D.

The relationship between the types and quality of housing in which people live and their mental health is complex and undoubtedly influenced by many factors. The personalities and personal histories of the people obviously affect the relationship—a mother whose child has been killed by a car with screaming brakes will be quite differently affected by some kinds of noises than one without this experience. Persons with obsessive or depressive drives toward cleanliness will be greatly distressed by dirt which might not bother them when in a more healthy frame of mind.

The scientific determination of the relationship has, for the most part, escaped quantification, largely because the quality of housing and the quality of mental health have not yielded to replicable quantification. Gross measurements of both are available and reasonably replicable but in each sphere there are subtleties which are highly important but have not yet proved quantifiable.

Housing evaluation encompasses not only the physical qualities of the living structure itself, but the setting in which it stands. The reputation and physical appearance of the neighborhood and its aesthetic appeal or repulsiveness are factors to be considered. Traffic patterns in the neighborhood have an effect on the outlook of the inhabitants upon the world about them.

One of the most firm findings relating the physical structure of the house to "social health" is that high-rise living tends to reduce neighborly relationships between inhabitants. Such housing is appropriate for some kinds of families but should be planned so that personal services have the opportunity to compensate for lacks which appear to be inherent in the structure. An assigned social organizer, with space provided for meetings and activities, arrangements made for child care and supervision, etc. may be able to offset the recognized problems which appear to be associated with high-rise living. The human trait of neglecting the cleanliness of shared space for which no one has direct responsibility must receive attention, particularly as regards stairwells and public toilets.

Within the individual dwelling unit there are many factors which probably affect the health of the inhabitants. These factors are not to be weighted equally in all cases since cultural groups are known to vary in estimate of the desirability of privacy, bodily contact and many other matters. Nevertheless, there is a demonstrated relationship between the crowding of the house and health, clearest in relation to the infectious diseases but certainly present also in relation to accidental injury and emotional satisfaction. Such matters as difficulty or impossibility of maintaining cleanliness and order in the house affect the mood and temperament of the mother primarily and through her the emotional state of the family members.

The effects of temperature within the living structure on the health of inhabitants is much debated. It is clear that sleep and rest are disturbed when temperatures are excessive, particularly at night. Cold, in a house without central heating, may force the concentration of so many people into small heated rooms that their activities interfere, resulting in chronic irritation and tensions in the home. Obviously the factors of heat and cold influence traffic patterns within the living quarters; the design of the house to facilitate movement of the people within it proves to be a complicated matter but one worthy of consideration as a means of meliorating the stresses of family or group living. Such factors may determine how much time the adult males spend with the family group.

Equipment in the house, including appliances and built-in furniture, are most important in their effect on mood of the mother or the mother-surrogate who is usually the family manager. The goal must be to increase her efficiency so that excessive fatigue does not contribute to destructive moods or to attitudes of defeat and frustration. Noises associated with household appliances rarely reach levels that damage hearing but may be of emotional significance.

Ambient color in the household is generally agreed to affect mood, but clear-cut experimental demonstration of its effect is not available. There is obviously a relationship between color in the sense of wall covering and paint upon the ease of maintaining cleanliness and in the amount of useful light available.

It may be assumed that mental health will be harmed by any factor in housing which decreases general health. The interdependence of mental and physical health is clear. Furthermore, there is sound evidence that illnesses of all sorts tend to "nest" together.

Physical structure and the community setting in which the dwelling stands undoubtedly affect the well-being of people, but so many factors difficult of evaluation are involved that the weighting of any one is peculiarily difficult. One of the generally accepted conclusions of the conference, most strongly supported by the author of this paper, was that deficiencies of structure and even of the larger setting can, in some instances, be offset by the introduction of personal services such as provided by visitors or community organizers.

It is most important that the health of the household manager, usually the mother or mother surrogate, be protected from excessive fatigue and frustration through design for adequate storage space, easy cleaning and appropriate appliances. Her mood and attitude, the factors above mentioned, the traffic patterns within the household and the possibility of privacy probably determine the amount of time the adult males will spend in the family circle.

Although there are few definitive research results relating any simple housing factor or congeries of factors directly to the mental health of the occupants of dwelling, most authorities in the field agree that there is a relationship between good housing and good mental health and bad housing and poorer mental health.

PERSONAL, FAMILY & SOCIAL CONSEQUENCES ARISING FROM HIGH-DENSITY HOUSING IN HONG KONG & OTHER MAJOR CITIES IN SOUTHEAST ASIA

by Robert Edward Mitchell

The purpose of this paper is to ascertain the effects, if any, that different dimensions of housing, especially density, have upon patterns of interaction among members of a family, levels of emotional strain manifested by individuals and attitudes toward housing. Southeast Asian cities in general, and Hong Kong in particular, provide ample opportunity for such an investigation because of the wide intercity and intracity variations in housing conditions. But it is obvious from the intercity comparisons of housing conditions and levels of strain that it is not possible to explain differences in levels of strain by referring to housing conditions alone. This fact also reminds the researcher that it is necessary to first control several of the major influences on emotional health and family cohesion before assessing the potential effects that housing has on the key dependent variables.

When these controls are applied, densities within individual dwelling units are seen to have a very limited range of effects. These effects are not altered by considering other features of housing, including the number of rooms, amenities, absolute amount of area, and the number of individuals within a dwelling unit. The major effects are listed and discussed below.

1. Attitudes toward housing, especially toward the amount of space that one has and toward the lack of privacy, re-

spond clearly to densities within dwelling units. No doubt many critics of high-density housing, along with those subjected to these densities, are very conscious of the absence of space. But this consciousness should not be confused with deeper levels of emotional strain.

2. High densities also affect two superficial manifestations of emotional strain: worry and unhappiness. It is necessary, however, to statistically control for other stresses producing these strains. When only one of these controls—the stress of poverty—is applied, these two superficial strains still respond to high densities, but they do so only for the poorest members of the communities surveyed in this study.

3. Densities do not affect deeper and more basic levels of emotional strain and hostility.

4. Although high densities and other physical features of housing do not affect deeper levels of strain, the social features of housing have an important impact on these strains. Most importantly, the doubling-up of nonrelated households tends to create stressful situations, especially if it is difficult for the household members to easily escape each other by retreating outdoors. It is more difficult to retreat in this way when the dwelling unit is on an upper floor of a multistory building. Therefore, multistory buildings, when combined with sharing arrangements, can have negative effects on the emotional health of individuals. These effects probably arise from forced interaction among nonrelatives, not from high densities or large numbers of fellow kinsmen. Large numbers of people in high density housing can be tolerated more easily if these people are one's kinsmen.

5. Although the various housing conditions have no apparent effect on patterns of husband-wife interaction, densities have a clear impact upon parent-child relationships. Parents in high-density housing evidently do not discourage their children from leaving the house, thereby temporarily relieving the high densities. But this solution to high densities tends to reduce the parents' knowledge of and control over their children.

6. High density housing also discourages interaction and friendship practices among neighbors and friends.

Therefore, some of the major effects of housing pertain to the fabric of social life and social control in neighborhoods. Residents in upper floors in multistory buildings are no doubt encouraged to leave their dwelling unit if they share the unit with other households. If they do not leave, they tend to develop higher levels of emotional illness and hostility. Residents on the ground floor are able to avoid this situation because it is easier for them to use the street as an adjunct to their home. This pattern of effects is much less common in public housing because the Hong Kong government's regulations discourage these sharing arrangements.

Children who live in high-density housing, regardless of their floor level, also are pushed out of the house, a pattern that tends to reduce parental control over the children. And with very little home visiting among neighbors who live in high-density dwelling units, the potential for friendly relationships among neighbors and the development of a positive neighborly community consciousness is made more difficult.

These pushes resulting from high densities in Hong Kong may help to explain some of the apparently high street-densities, although the colony's crowded streets would seem to be a normal consequence of the extremely high ground-densities in the urban areas.

It is possible that the organization of space outside individual dwelling units and buildings, especially at the ground level, may be the most significant issue to which town planners should give their attention. Individuals, apparently, can tolerate very high densities within their own family dwelling unit, but these high densities may create a street environment that is socially unhealthy to the community.

HOUSING CODES — SELECTED ECONOMIC IMPLICATIONS

by Frank G. Mittelbach and Leland S. Burns

Housing codes are only one illustration of a variety of local regulations whose economic consequences are often treated cursorily in promulgation and administration. Presumably, the goal of housing codes is to enhance the general welfare of the population. This goal can be examined by reference to several premises on which housing codes are generally based including the following: (1) They represent minimum housing standards which society should attain; (2) They are intended to protect the health and safety of residents, neighbors and passers-by against the deleterious effect of low-quality housing; (3) They will preserve the quality of the existing housing stock; (4) They are a necessary constraint resulting from the interrelationships between housing and other private and public activities.

Reportedly, minimum housing standards often go unenforced. Many reasons can be advanced for this situation, not the least of which is that frequently communities develop housing codes to permit their participation in federally funded urban renewal programs. Yet, often sufficient funds are not made available from local resources for comprehensive code enforcement. One reason is that communities probably are aware that housing code enforcement places cost burdens on consumers, particularly low income populations, especially if no assistance is made available to meet minimum standards and benefits are of uncertain magnitude. Nevertheless, minimum standards can perform the function of providing a measuring rod against which progress in upgrading the housing stock is viewed. In this sense they are equivalent to an ever changing "poverty line" which can be used to determine how many people are above or below the line. One can then establish the resource requirements necessary to achieve the standards compared to resources required for other programs. Generally, this concept has found little or no expression in the housing codes literature. The prevailing view is that housing standards *must* be met to ensure *minimum* levels of health and safety of the population. This view requires that the consequences of housing codes versus no housing codes be clearly determined.

In addressing the issue of minimum standards, substitution effects must be examined. With respect to safety standards in housing, substitutes probably are few and socially not acceptable. Also, the links between unsafe conditions and accidents are more direct than for other types of hazards in housing and the residential environment. With respect to features in housing which are claimed to reduce the ravages of certain illnesses a much wider range of substitutes are available. Preventive medicine, development of drugs to expedite recuperation during illnesses, access to superb health facilities or improved nutrition are all examples of alternatives. Thus, application of minimum standards today may make little contribution to improved physical health because the problems they attempt to tackle are more effectively resolved via other means. Morover, even if standards make some contribution, no assurance is present that they are less costly than available alternatives.

Entirely different questions arise in considering whether standards actually induce a higher level of housing consumption and generally improve welfare of people. Unless assistance is available to meet the standards, supply prices of housing, especially for low income families, probably will rise. A redirection of consumption patterns in the final analysis could reduce health and welfare. Perhaps the "society knows best" argument is correct and consumers will spend more on healthful housing and less on other goods and services with a low health pay-off, but it would be pure conjecture to say such an outcome is inevitable. The final effect on total health associated with the establishment of minimum standards is quite uncertain.

Similarly, the notion that by way of comprehensiveness and strictness in codes landlords can be "cornered" into supplying decent housing must be questioned. The implicit assumption is that landlords supplying poor housing enjoy windfalls which codes and their enforcement will wash away. Even if one grants the assumption of high profits, the effect of code enforcement is likely to be a reduction in the supply of housing for low income populations at prices they can afford.

Undoubtedly, in connection with housing assistance programs society desires to establish standards so that funds are applied to housing improvements considered essential and are not frittered away. In this approach, codes are only part of a total program to channel more resources into housing. The standards in this case are criteria and are not meant to be a causal force in increasing the amount of healthful housing.

Moreover, assessment of the incidence of ills resulting from poor housing and assignment of responsibility for upgrading the housing stock in code enforcement involves the widespread and often ambiguous concept of social costs. Lack of specific knowledge regarding incidence of social cost and economic alternatives foregone in the process of internalizing these costs via the process of code enforcement raises additional complexities.

Comprehensive analyses of the direct and indirect effects of minimum housing standards are sparse. The assertion by many well-intentioned individuals that development and enforcement of comprehensive minimum housing standards produce major health benefits, especially for the poor, is thus challenged. The purpose of this challenge is to broaden the discussion and move away from narrow legalistic questions or issues revolving around the reasonableness of specific standards.

ACCIDENTS AND THE RESIDENTIAL ENVIRONMENT

by Raymond Neutra, M.D., M.P.H.,
and Rose McFarland, Ph.D.

This paper begins by defining an "accident" and describes the magnitude of the accident problem in the residential environment. In 1968, for example, 20 million persons were injured in home accidents of whom 110,000 were permanently disabled and 28,500 were killed. This resulted in $1 billion lost in wages and another half billion lost in medical expenses. To this could also be added pedestrian, bicycle and playground accidents.

In focusing attention on the residential environment rather than "housing", the authors are recognizing that the unit of design is rapidly becoming the neighborhood and its attendant facilities. The residential environment influences the course of the accident process in each phase of its development; preventing accidents, minimizing injury, facilitating early treatment, rehabilitation and accommodating disability.

It is clear that a large proportion of the coming residential environment will be shaped by relatively few people particularly because of the increase in industrialized homes and new towns. This concentration of decision making has positive and negative aspects, negative because bad design features could be repeated in fantastic volume and positive because profound improvement could be effected by influencing only a few planners and manufacturers.

The most common types of residential accidents are falls, fires, pedestrian accidents, bicycle accidents and poisoning. Each needs to be studied separately to see what forms of environmental intervention can be the most effective. Further, we should be able to reduce a particular problem by another increment by adding an educational intervention to the environmental one.

In view of the foregoing, the authors make five specific recommendations for action which should be taken:

The first is for a reassessment of the total accident problem in urban, suburban and rural areas of the United States. Such data can be used to provide a baseline and a starting point for accident prevention programs in various regions.

Secondly, mass-produced housing and new town neighborhoods should be recognized as products. Governmental funds should be provided so that it is economically possible for producers to research and design their product adequately and mechanisms should be provided for pre-market testing, for surveillance and for long-term evaluation.

The third recommendation is for on-going research and development for the residential environment. Traditionally the government approach to the problem of housing quality has been to promulgate a set of standards which ossify into an outdated solution. Teams of human factors specialists, social scientists, architects, industrial engineers and epidemiologists should be supported in an effort to keep current the criteria for designing a safe home environment.

Fourthly, surveillance and evaluation should be carried out. Epidemiologists should be devising a way to evaluate the ultimate success of a design.

And finally, there should be a pre-market testing of industrialized housing and of home environments.

As an appendix to their paper the authors analyze information available to date concerning specific categories of accidents and the changes in environmental design which could be effective in reducing their incidence.

THE PHYSIOLOGICAL ASPECTS OF SPACE AND CONGESTION

by Robert S. Pogrund, Ph.D.

The Physiological Aspects of Space and Congestion are described by three basic considerations: (1) an historical approach of experience gained from observing men inhabiting areas of limiting confinement associated with such voluntary or involuntary occupations as the U. S. Navy and Maritime Service, imprisonment for criminal offense, or polar expeditions; (2) an evolution of Human Factors simulation studies designed to confine human males to restrictive chambers over measured durations while extrapolating such psychophysiological data for their relevance to crew selection in Aerospace and Submarine missions; and (3) the space requirements for adequately venting metabolic gases produced by human respiratory and excretory organ systems.

These three aspects are treated within a conceptual framework of environmental stress as the stimulus for a variety of psychophysiological response mechanisms, whose parameters are measurable as a function of available volume per man and duration of confinement. Detectable impairment is assayed by observed decrement in intellectual, perceptual, and manual performance, as well as by psychological testing and subjective comments relating to such behavioral alteration and somatic complaints. Such observations are further correlated with the nature and extent of physiological and biochemical changes to reflect the degree of departure from comfort zones of expected homeostatic hormonal and organ system balance. Such measurements include the excretion of catecholamines and corticosteroids, pulse rate, respiratory rate, blood pressure, electroencephalography, galvanic skin resistance, blood volume, cardiac stroke volume, hematocrit, vital capacity, nitrogen balance, body water, exercise tolerance, and orthostatic tolerance.

The review work of Fraser is particularly cited for its pertinence to this topic of investigation, but it must be emphasized that the described semiquantitative analyses have been obtained on highly selective human male subjects whose health and age have already qualified them for the rigors of military duty or space vehicle missions. The applicability of such data to a general human population of such variables as genetic endowment, age, medical history, nutritive status, sex, race, culture, and psychosocial stress, remains as an area of further research. However, the investigations that relate to such general populations are cited, although limited in interpretation because of an absence of an articulate predictive model. Such a model would permit the computerization of the maximum, minimum, and optimal density for a population of defined variables or different cultural factors.

Besides the imposition of stress on human population by mere restrictive spatial configuration and the duration of exposure to such confinement, a further consideration of human tolerance to specified concentrations of metabolic gases is presented. By inference, such concentrations would be a function of the diluting capacity of the available volume per man, the rate of gaseous and/or particle production and the rate of removal by established air conditioning or ventilation technology. The basic criteria for such evaluation includes both the toxicology of such physical-chemical stressor agents on organ systems as well as the esthetics of human exposure to certain odoriferous compounds produced by metabolic activity. Although the gaseous composition of intestinal flatus is described, the emphasis is placed upon consideration of toxic levels for carbon dioxide and carbon monoxide for their more likely occurrence in the urban circumstances and unvented living quarters. The esthetics of odor removal is presented as the most acceptable rationale for moving air at the rate of up to 30 cubic feet per minute. This ventilation rate would be likely to preserve the "safe" limits of carbon monoxide to preferably less than 10 ppm and of carbon dioxide to less than 1.5 volume per cent. Such safe limits for human exposure are designated to include all forms of human activity, ranging from sedentary occupation to physical labor.

The application of these data to the general population depends upon an experimental design that utilizes the bioinstrumentation technology practiced in the field of Aerospace Physiology. Biomedical telemetry offers a suitable means of studying human autonomic nerve systems activity, as well as cardiopulmonary and cardiovascular function in a variety of space volume circumstances and associated duration of exposure. Such an experimental program would permit a more realistic assessment of human responsiveness to a preprogrammed set of environmental parameters. The completion of such data acquisition should permit the construction of a predictive model that is more suitable for a broader interpretation of standard setting for an urban population. Aerospace physiological simulation studies indicate a preference for 600 cubic feet per person as a desirable spatial configuration. The lowest acceptable limit would be approximately 300 cubic feet per person. The described data further indicate that psychophysiological comfort zones would be compromised by habitation in less than 300 cubic feet per person. The validation of these data in the general population awaits the application of similar bioinstrumentation procedures upon human subjects whose cultural and genetic endowments and other variables are selected for their divergence rather than convergence.

COMPARATIVE ANALYSIS OF BUILDING CODES, WITH HOUSING ORDINANCES AND STANDARDS

by C. L. Senn, P.E.; M.S.P.A.

It is assumed by most persons that building codes and housing codes have the same basic objectives, i.e., to require that housing and its immediate environment meet specified minimum standards deemed necessary for health, safety and general welfare. The major difference between the two types of codes is that building codes apply to new construction and major alterations, whereas housing codes are intended to apply equally and retroactively to all existing housing. Since the housing codes become effective immediately upon occupancy of new buildings, it is logical to presume that building codes will contain all of the requirements of housing codes which relate to design, arrangement, materials and facilities that are normally considered part of the building.

The four major uniform codes considered in this review are the:

1. "Basic Building Code" of Building Officials Conference of America, Inc. (BBC) 1965.
2. "Uniform Building Code" of International Conference of Building Officials (UBC) 1967.
3. "Southern Building Standards Code" of Southern Building Code Congress, 1965.
4. "National Building Code" recommended by the American Insurance Association (successors to the National Board of Fire Underwriters) 1967.

In addition, because it was nationally hailed as a "modern performance type code" the study included the City of New York Building Code, December 1968. For further comparisons, the Appendix to the paper includes relevant features of current FHA minimum property standards and the proposed comprehensive Department of Housing and Urban Development "Housing Standards." (Review Draft) (1969).

A number of housing codes were reviewed but the principle basis of comparison was the APHA-PHA Recommended Housing Maintenance and Occupancy Ordinance, 1969.

The analysis of building codes indicated that none clearly establish minimum requirements for living room space, dining space, closet and storage space, cooking facilities, garage or off-street parking space, outdoor living area and design, orientation and building separation requisite for admitting daylight and sunlight, and natural breezes. None of the four uniform building codes were found to contain any standards or requirements relating either to construction or material features which would reduce noise entering the building from out-of-doors or protect occupants of apartments or rooms from noises generated in adjoining apartments or rooms. None contain any specific requirements concerning noise attenuation designs or installation of building equipment.

In addition to taking measures to assure that building codes require relevant elements contained in the housing code, applicable elements of the "APHA Basic Health Principles of Housing and Its Environment" are listed in the paper to indicate housing features considered necessary for health, which should be considered in developing new, comprehensive and integrated building and development regulations and standards.

The analysis concluded that there is need for a much more formally coordinated, integrated system for regulating the planning and design of the residential environment to assure conformance with good health criteria and to meet requirements of housing codes. A case is made for including in such regulations the most significant elements of the "Basic Health Principles of Housing and Its Environment." Failure of health and housing officials to exercise leadership with national building code writing and developing organizations is cited as a significant deficiency. The paper calls for a meeting of the minds of all concerned groups, with the objective of developing integrated building and development controls and housing codes and criteria.

In the Appendix, the paper notes that the New York building code, FHA Minimum Property Standards and the proposed "Housing Standards" for the Department of Housing and Urban Development do adequately cover the subject of noise control within the structures and that the new proposed HUD standards goes a long way toward establishing performance criteria to assure that housing built according to those standards will meet requirements of acceptable housing codes and will, to a large measure, conform with "The Basic Health Principles of Housing and Its Environment." It is particularly noteworthy that the proposed HUD Housing Standards cover not only units and structures, but also the residential environment.

DENSITY AND CONGESTION IN THE RESIDENTIAL ENVIRONMENT

by Charles L. Senn, P.E.; M.S.P.A.

A combination of the "population explosion" and a massive movement to urban centers is creating both high population densities and urban sprawl. The problem of space and congestion and its relationship to health is a fundamental consideration in planning new residential environment and in redeveloping and reevaluating existing ones. It is also fundamentally related to public policy in regard to the conversion of agricultural land to residential use, the planning of transportation, the cost of land and utilities, and many other community concerns. Area-wide planning facilitates provision of properly designed community facilities such as water supplies, sewerage systems, waste collection and disposal programs, communication and transportation systems and appropriately located open space. This enables creating relatively high density without necessarily producing adverse health effects.

While a large proportion of the American population has indicated a preference for large lots, individual yards, substantial setbacks from streets and a large total land area per family as indicated by huge tract developments surrounding most American cities, it is recognized that more efficient use of land is an important factor in reducing urban sprawl and in lowering housing costs. Such sprawling developments are also becoming increasingly recognized as an indirect means of causing segregation by economic and to a certain extent ethnic classes.

The paper analyzes the "planned unit development" concept which includes public areas for play and recreation maintained and supported by "homes' associations." By efficient design, costs of streets, sidewalks, utilities, land and services are significantly decreased. An Urban Land Institute study is cited as reporting a 1964 annual assessment cost of $30 to $75 per family for such services, which frequently include a swimming pool, tennis courts and other facilities.

"New towns" are cited as an example of large scale planned unit developments. Their increasing popularity in Europe leads to the conclusion that they would be similarly attractive in the United States. Dutch row houses and British terrace housing are further examples of means of saving land area while providing a high degree of privacy for the family. The popularity of this type development is indicated by a relatively large upsurge in "town houses" in the United States. The report of the "National Committee on Urban Growth Policy," titled "The New City"* published in 1969 and containing a Foreword by the Vice President of the United States, is cited as a recommendation by an authoritative group which studied European new town developments and concluded that, within the

---

**The New City,* National Committee on Urban Growth Policy, published for Urban American, Inc., New York: Frederick A. Praeger, 1969.

next decade, the U.S. should build 100 such communities for 100,000 people and ten such communities of a million or greater population each.

British Planner P. A. Stone is cited as saying, "The increasing use of land for urban development is one of the major social forces of our time—in local authority areas the land required for every 10,000 persons amounts to about 250 acres for broadly residential purposes: 120 acres for open space, 50 acres for industry, 40 acres for education, and something on the order of 150 acres for other urban use (a total of 650 acres or one square mile, per 10,000 persons)."

While individual families occupy relatively large land areas, American communities have failed to provide clear open space, green belts, play and recreation facilities and community facilities. In fact, the public has not recognized the need for open space and green belts to the extent necessary to fund their acquisition and maintenance. Even in developing the freeway systems there is no public policy for acquisition of land beyond that actually necessary for right-of-ways and embankments.

An important human factor is the variation in desires and living habits of the public. Many people prefer life in the inner city and have little desire for a single-family home and garden with attendant maintenance problems.

While some prefer outdoor sports, others prefer the culture and life in a congested city. Desires of families with children are different from those of families without. Age, occupation, state of health, economic status, and many other factors produce variability in human wants and likes, which must be taken into account in considering the question of space, congestion and facilities in the residential environment.

One of the objectives of space is to admit light, air and sunshine to the living quarters and to enable occupants to have a pleasant view. Modern technology enables provision of suitable artificial substitutes for light and ventilation. In fact, such an "artificial environment" enables exclusion of a large portion of the residential noise and air pollution. It may then be appropriate to permit windowless rooms for those occupants who are satisfied with an artificial environment. On the other hand, it is noted that a Dutch survey of 1,000 householders revealed that admittance of sunlight and a pleasant view are among the most cherished attributes of housing.

Attainment of objectives of open space are not necessarily assured by present American procedures for regulating developments and the processes are highly fragmented. Subdivision regulation and review is frequently completely separated from the functions of the building official. Zoning regulations tend to "freeze" certain stated mandatory requirements related to setback, side-yard areas, etc. Building codes do not set adequate requirements relating to open space and some specify only space necessary for fire protection. Zoning regulations frequently make it impossible for developers to consider "planned unit developments" and other innovative designs may more efficiently provide space for light, air, ventilation, play and recreation. Studies by the British planner, P. H. M. Stevens and others, are cited to indicate the practical limit of about 200 persons per acre for building up to 12 stories high. As a result of analyzing a number of American and European studies and standards, the paper concludes that with modern type design, providing reasonable open space and where garages are provided within the building, a minimum of 1,320 square feet of land area per family would be required with a 13 story building. A total residential land area of one acre would accommodate 30 families per acre. These figures compare closely with the British authorities who say that even with 13 story buildings not more than 31 families per acre are recommended.

The studies cited in the position paper by Robert Mitchell on high density housing in Hong Kong are cited to show that even the densities of 2,260 persons and 324 families per acre did not produce measurable adverse health effects. That density is more than 10 times the maximum recommended by the British. FHA's "Land-Use Intensity" standards developed by Mr. Byron Hanke are cited as an American example of performance for land-use standards that have promise but need in-depth sociological study. Using the FHA chart and data, it is shown that 234 units of approximately 1,100 square feet would be allowed in the 13-story building on land of five gross acres. A further analysis of the land-use intensity chart is made by comparing requirements with those outlined in APHA's "Planning the Neighborhood." The land-use intensity standards would require about 40 percent more space for "outdoor living" than "Planning the Neighborhood" and would seem to be acceptable in that regard. Space for noise control is considered in terms of the distance of separation between single family units, distances between freeways and living units and geographical locations of residential units in relationship to busy jet airports. At the same time, consideration is given to the desirability of providing space to permit dilution of air pollutants emitted by vehicles on crowded, congested freeways. A point is made for the fact that there is a finite limit to the capacity of the atmosphere to provide dilution of air pollutants during periods of adverse climatic conditions when wind velocities are low and temperature inversions are severe.

While this is largely a function of source reduction, pending such solutions, a case is made for limiting the size of cities as a means of minimizing such air pollution problems. Practices in the USSR and certain other European countries favor limiting communities to a size between 250,000-1,000,000 people. Similarly, a strenuous effort is made by governmental officials and local officials in the USSR and Britain to limit the size of their largest cities, like Moscow and London. Similar steps should be considered in the United States in terms of controlling the health effects of high density over a large geographic area.

Several different schools of thought exist concerning the desirability in setting specific criteria for controlling developments. One group favors updating APHA's "Planning the Neighborhood" as a relatively specific set of "requirements." Another group would eliminate all such requirements. A middle ground is suggested, that is, an in-depth study of the results of developments which meet FHA's Land-Use Intensity requirements and which are located in various geographic areas and occupied by families of various compositions, age groups, incomes, ethnic origins, and other relevant factors.

Throughout the paper is woven the thought and admonition that high density, per se, need not necessarily result in "congestion and adverse health effects." Goals, aims and aspiration of the occupants are paramount in determining groupings and surrounding of their living quarters. Recognition is given to the fact that as cities continue to grow in population and area, more thought must be given to minimize their congestion and its adverse effects.

An Appendix summarizes data from a number of European studies covering such items as play habits of children, community and housing noise control standards for space needed for various elements in the environment related to health and sociological studies. Particular attention is directed to extensive studies made under the auspices of the Economic Commission for Europe by the Swedish National Building Research Institute summarizing current European practice. Data are from a questionnaire asking, "What are the present standards?" "What is the scientific basis for those standards?" and "What means are used to measure for conformance?" Admittedly, relatively little information is available on the "scientific basis" for the standards.

The paper concludes with the summary on a working paper prepared by the late Professor Jacques Parisot for WHO's Expert Committee on the Health Aspects of Housing, in which he points out that movement of large numbers of persons and families into high density housing must be accompanied by adequate social amenities and services.

It can be said that the paper provides recommendations and support for two major considerations which are:

1) that any criteria, guides or standard for the residential environment must take into account the variability of human wants and needs, as determined by

a) individual preference

b) family size and composition

c) age, basic desires and preferences of the people who happen to occupy the project area

2) a case is made for utilizing "planned unit developments" and other relatively high density housing as a means of reducing cost, an essential element in securing adequate housing for persons of low and moderate income.

Research should include in-depth studies of existing developments of various kinds so as to obtain as much knowledge as possible from health and sociological studies of existing developments of all types.

SOME REFLECTIONS ON "REALISTIC" MINIMUM STANDARDS IN HOUSING

By Anatole A. Solow

Present housing standards are not only inconsistent but are often inappropriate and unrealistic. Standards embodied in housing codes are generally considered as necessary minima to protect the health, safety and welfare of the occupants, yet it has not been possible to enforce these standards in large parts of many urban areas; in other cases, indiscriminate enforcement has led to loss of available housing and other adverse consequences for the affected residents.

Minimum standards embodied in regulatory devices often impede the application of new cost-reducing technologies and the mass construction of special low-cost dwelling unit types.

In spite of all efforts put forth during the past decades the housing shortage gap for low-income (and even for many middle-income) families is steadily widening.

This situation may be due, at least in part, to the level at which standards have been set and held out as a goal applicable in theory to all, but unattainable in practice by many —unattainable because of the economic inability of millions of families to afford minimum decent housing, or because of the inability or unwillingness of the system to supply such minimum standard housing at prices which low-income families can afford.

The specified level of housing standards directly influences the cost per dwelling unit and, thereby, the quantity of housing that can be produced within the constraint of available resources. Thus, by defining the desired quality of housing, standards determine or reflect national, state or local housing policy.

Traditionally, standards for the physical components of housing have been justified in terms of health, safety and welfare considerations, presuming a definite relationship between housing quality and health. However, the difficulties in relating specific standards to health, with the limited scientific evidence available up to now, are being increasingly recognized. In practice, standards applicable to housing of low-income families have been greatly influenced by middle class values held by the professionals and public officials responsible for the setting of standards. These values do not necessarily reflect the life styles and needs of low-income families. Yet, these families have had little opportunity to express their preferences and to participate in the formulation of standards which affect them. Moreover, the definition of desirable housing quality—what constitutes a standard or a substandard house —is determined less by science and knowledge and more by what society considers economically feasible, socially desirable and politically acceptable at any given time.

Standards as presently conceived reflect equalitarian principles and the aspirations of an affluent society. Yet, they are not obtainable for many. If, on the other hand, minimum standards are lowered, they may open the door to arbitrariness, unequal treatment, exploitation by irresponsible builders or landlords and the continuation of substandard housing stock as measured against desirable health criteria.

In spite of this dilemma, a new and more realistic approach to the setting of standards is needed.

In developing countries the pressure of limited resources combined with vast housing needs of masses of urban low-income families is forcing a reconsideration of many traditional policies. In the United States, in spite of its affluence, conventional measures have also failed to solve the housing problem in line with professed aspirations.

Minimum standards may have to be modified or temporarily relaxed under special circumstance in order to facilitate incremental housing improvements for large numbers of low-income families. Already there is evidence of new approaches in many recent writings and in several new programs.

The 1968 Housing Act implies that minimum housing standards should be such as to facilitate the utmost mobilization of individual self-help efforts. HUD's massive "Operation Breakthrough" program recognizes that standards embodied in local housing codes and zoning regulations need to be modified to facilitate large-scale use of new technologies which could reduce housing costs. In California, Massachusetts and Michigan the States may preempt local codes and ordinances for mass-produced and subsidized low-cost housing. The success of FHA's experimental CHOICE program for non-subsidized middle-income housing is attributed, at least in part, to the relaxation of standards. Increasing emphasis on programs of rehabilitation rather than slum clearance requires the reconsideration and adaptation of minimum standards to special situations.

The efforts of the U.S. Public Health Service to incorporate minimum neighborhood standards into housing codes reflect the growing importance attached to the quality of the neighborhood environment and community facilities as against just the individual dwelling.

There is urgent need for much more research and experimentation to develop minimum standards based on new criteria and concepts. Uniform standards should be modified to recognize variations due to socio-cultural and economic characteristics of families. The specific needs and life styles of low-income families should be taken into account. Standards should be used *positively* to encourage self-help action and to stimulate improvement programs. A *system* of standards should be developed which would provide substitutibility of individual components and selection of priorities within a total neighborhood environmental level. Minimum standards should take into account the dimensions of time and rates of change which would permit *incremental gradual improvements over levels of existing conditions* and adaptation to changing conditions and aspirations of the community.

Essentially, what is being advocated here is a re-examination of the rigid concept and application of minimum standards, placing much more emphasis on a situational, dynamic and process-oriented approach. More effort should be directed toward developing standards that act a sguides and stimuli for *progressive* housing improvement and not as models of static conditions.

THE ROLE OF SOCIAL SCIENCES IN PLANNING

by Dr. Sven Thiberg

This paper is based on the assumption that man's factual needs should steer the design of the physical environment. It also takes for granted that the main task of social scientific research is to investigate and identify man's needs and thus provide a basis for environmental design. There is a long way to go in all countries before the social and psychological needs of man are completely recognized partly because of internal problems of research in these fields and partly because of poor communication between researchers, decision makers and laymen.

Research results cannot be better than permitted by the theory and methods applied and in many cases an understanding of the results might be facilitated by documentation of theories and systems of reasoning on which they are based.

An assumption is made that priorities should be given to research which will extract information which can be used to improve man's living conditions. Further, it is important to evaluate whether additional information in an area will have sufficient effect to be of substantial value.

One of the main problems is to implement what is already known by means of practical, political, economic and technical measures. Increased investment in research in the social sciences is occurring because of a rapid increase in investment in urban development and because of rapid changes in social economic systems. The planners need, though do not always use, information from the social scientists.

There are three main approaches all of which can contribute necessary information. The first, goal-defininining studies, must evaluate physical, social and mental needs of people so that sociopolitical objectives can be measured with some reliability. We particularly need such information concerning the developing nations as inappropriate goals are often assumed based on European patterns of living.

Secondly, studies of social systems and changes are needed. While the bulk of social scientific research has been directed toward existing social systems, the informational value in practical planning is limited. This is true in part because of the static rather than dynamic quality of the analyses.

Finally, an approach is necessary which coordinates research and planning. Joint development projects should be funded which include careful investigation of the information available, the development of a model, the application of this model and follow-up and evaluation of the project.

The foregoing directly relates to the four aims of the conference: to exchange knowledge, to identify areas of study, to recommend priorities and to stimulate research. In view of the bulk of information available, it is essential that it be distributed in brief, usable form. Then priorities for further studies can be established for different regional and national conditions.

SOCIOCULTURAL FACTORS IN RESIDENTIAL SPACE

by Daniel Wilner and William Baer

This paper reviewed some sociologic studies relating to housing, space and residential congestion. It was found that traditional objective measures of space (area, distance, etc.), were not sufficient by themselves to explain the effects of space and congestion on man. Subjective perceptions and evaluations of space, as well as considerations of relative space size situations, were equally if not more important.

Studies of crowding in lower organisms revealed that at some point congestion is counterproductive for a species. Direct analogies to the situation of man, however, while providing useful insight must be treated with caution for man has the capability to both alter his physical environment if it does not suit his purpose, (adjustment), or failing this, to change his evaluation of this environment through changes in stimuli perception or "redefining" what constitutes beneficial surroundings (adaptation).

Historical incidents of extreme crowding were examined (slave ships, prison camps, etc.,) but effects of space alone in these pernicious instances were difficult to isolate from other factors (treatment by captors, availability of adequate medical treatment, etc.).

Studies dealing with personal space (a bubble-like space that immediately surrounds and accompanies an individual) provided some suggestive quantitative data as to person/space needs in group and public areas. Further research should provide data pertaining to families occupying residential space.

Perhaps the most interesting finding was the apparent cultural and social class differences in the perception of space, the value placed upon it and the consequent differences in space utilization. A summarizing typology was constructed which suggested that the major differences on the continuum from lower to upper social class lies in a shift from a polychronic orientation to space to one of monochronism. That is, territoriality is exchanged for notions of compartmentalized space and space use. Furthermore, as more space is acquired, there is a shift in space utilization from providing for fundamental needs to space used as a symbol of cultural status.

Finally, observing family behavior in the market place reveals that the family cycle is an extremely important consideration: that the "lumpiness" of changes in family size and the lack of concomitant increases in family income necessitate households making a number of tradeoffs between space and other necessities such as food, clothing, household location and even time (doing without adequate space in the present so as to improve one's space circumstances in the future).

In conclusion, emphasis was placed on the difficulty of dealing with space and congestion effects alone without regard to a host of other considerations. The residence is not necessarily a prime mover of personal-social events, but an arena in which many social factors exert their influence on human beings. Housing may well be the consequence of social forces as well as their originator.

While the search for space standards for sociocultural purposes based on "hard" evidence is laudable, it is exceedingly difficult. Furthermore, we must consider epoch-related principles of social acceptability which cannot be directly tied to evidence gathered on other bases. Since "standards" may become encrusted by lags in technical and social change based reformulations it is necessary that housing-space standards be continuously and regularly monitored for their appropriateness and congruity with socio-technical advances.

PAPERS CONTRIBUTED

Air-Conditioning and Refrigeration Institute, *Draft of A Municipal Ordinance to Regulate Sound Produced by Air-Conditioning and Air-Handling Equipment*, Arlington, Virginia.

Borsky, Paul N., *Effects of Noise on Community Behavior*, reprint from ASHA Reports, No. 4. 1969.

Botsford, James, *Using Sound Levels to Gauge Human Response to Noise*, reprint from Sound & Vibration, October 1969.

Department of Housing and Urban Development, *Land Use Controls: Aircraft Noise Working Paper*, Washington, D.C. December 1969.

Institute of Gas Technology, *Indoor Air Pollution*, Chicago, Illinois.

Mittlebach, Frank G., et al, *Optimization Problems in Housing Investment*, Graduate School of Business Administration, U.C.L.A.

Moore, Eric G.; Betak, John F.; Wellar, Barry S.; *Comments on the Definition and Measurement of Housing Quality*, Department of Geography, Northwestern University, Evanston, Illinois; August 1968.

Moore, Eric G., *Rapid Surveys of Housing Quality Using Remote Sensing Techniques: A Summary of An Experiment*, Department of Geography, Northwestern University.

Tewarson, Archibald, *Progress Report on Generation of Lethal Environments in Building Fires*, Factory Mutual Research Corporation, Norwood, Mass., 1970.

To Make Man A Success On Earth, proceedings of the National ARI-American Home Air Conditioning Forum, June 1969.

Warburton, Ralph, *Systems Design for Urban Transit*, reprint for Journal of Franklin Institute, Volume 286, No. 5, November 1968.

Wellar, Barry S., *Appraisal of the Housing-Environment Component of Urban Areas: Quality Versus Quantity Items, and Methods of Data Generation*, University of Kansas, Lawrence, Kansas.

World Health Organization, *Proposals for a Research Programme On Housing and Health*, Geneva, Switzerland, 1963.

CONFERENCE ATTENDEES

LIST OF ATTENDEES

Mr. P. R. Achenbach
Chief, Sensory Environment Bureau
National Bureau of Standards
1322 Kurtz Road
McLean, Virginia

Mr. Henry L. Albert
Director, Division of Housing and Institutional Environment
Commonwealth of Pennsylvania Department of Health
P.O. Box 90
Harrisburg, Pennsylvania 17120

Dr. Christopher Alexander
College of Environmental Design
University of California
Berkeley, California 94720

Mr. Roger I. Alley
Staff Director
National Association of Real Estate Boards
1300 Connecticut Avenue, N.W.
Washington, D.C. 20036

Mr. William C. Baer
UCLA Department of Political Science
2846 Burkshire Avenue
Los Angeles, California 90064

Mr. Frederick H. Bair
Consultant
Bair, Abernathy and Associates
P.O. Box 828
Auburndale, Florida 33823

Miss Frances S. Barnett
Housing Division
U.S. Bureau of Census
Washington, D.C. 20233

Mr. Herbert Behrend, P.E.
Director, Planning and Consulting Services
20 N. Wacker Drive
Chicago, Illinois 60606

Dr. Arturo Luis Berti
Director, Direccion General de Malariologia
Ministerio de Sanidad Y Assistencia Social
Centro Simon Bolivar
Caracas, Venezuela

Stanley K. Bigman
3302 Camalier Drive
Chevy Chase, Maryland

Mr. Paul Brace
Department of Housing and Urban Development
Washington, D.C. 20410

Captain Clifford R. Bragdon
Environmental Specialist
U.S. Army Environmental Hygiene Agency
Edgewood Arsenal, Maryland 21010

Miss Helen J. Breslauer
Urban Studies Center
Rutgers — The State University
137 Church Street
New Brunswick, New Jersey 08903

Dr. Maurice Broady
Senior Lecturer in Sociology
University of Southampton
Southampton, England

Mr. Robert M. Brown
President, National Sanitation Foundation Testing Laboratory, Inc.
P.O. Box 1468
Ann Arbor, Michigan 48106

Mr. Albert H. Brunwasser
Chief, Bureau of Environmental Health
Allegheny County Health Department
620 City-County Building
Pittsburgh, Pennsylvania 15219

Professor Leland S. Burns
Architecture and Urban Planning, Room 4274 GBA
University of California, Los Angeles
Los Angeles, California 90024

Mr. Carlos Campbell
HUD Building
451 - 7th Street, S.W.
Washington, D.C. 20410

Mr. Eric Carlson*
Chief, Housing Section
Center for Housing, Building and Planning
United Nations
New York, New York 10017

Mr. Julius Cinque
DHEW, Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Mr. Ed Colleton
Trailer Coach Association
1430 West Third Street
Los Angeles, California 90017

Dr. Paul B. Cornely
President, APHA
Chairman, Department of Preventive Medicine and Public Health
College of Medicine
Howard University
520 West Street, N.W.
Washington, D.C. 20001

---

*Represented by: Mr. Naigzy Gebremedhin

Mrs. Ruth Crone
Department of Community Resources
Metropolitan Washington Council of Governments
1225 Connecticut Avenue, N.W.
Washington, D.C. 20036

Dr. Thomas J. Crowley
Research Associate
Harvard School of Public Health
665 Huntington Avenue
Boston, Massachusetts 02115

Professor Ido deGroot
Epidemiology and Environmental Health Planning
University of Cincinnati
2926 Woodside Place
Cincinnati, Ohio 45219

Mr. Patrick Doyle
President's Committee on Mental Retardation
Washington, D.C. 20201

Matthew P. Dumont, M.D.
Center for Metropolitan Studies
National Institute of Mental Health
Barlow Guilding, Room 8A07
5454 Wisconsin Avenue, N.W.
Chevy Chase, Maryland 20015

Mr. Sidney Edelman
Deputy Assistant General Counsel
Division of Public Health Grants and Services
Department of Health, Education, and Welfare
Office of the Secretary
Washington, D.C. 20201

Mr. Clyde Eller
Contract Officer
DHEW, Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Mr. C. Mauritz Erkilla
President's Committee on Consumer Interest
6025 F, Federal Office Building #7
17th and H Streets, N.W.
Washington, D.C. 20201

Mr. Olonzo Fike
Maryland State Department of Health
[illegible]05 North Charles Street
Baltimore, Maryland 21218

Mr. Weldon C. Fill
Housing Hygiene
Environmental Sanitation Program
222 East Central Parkway
Cincinnati, Ohio 45202

Mr. T. Robert Burke
Staff Attorney
National Housing & Development Law Project
Earl Warren Legal Institute
University of California
Berkeley, California 94720

Mr. Gershon Fishbein
Environmental News Letter
Washington, D.C.

Mr. Walter Fisk
Bureau Chief
U.S. News Service
862 National Press Building
Washington, D.C.

Mr. Pat Flanagan
Press Officer
American Public Health Association
572 Madison Avenue
New York, New York 10022

Mrs. Arlene Fonaroff, M.P.H.
Instructor
School of Medicine
Georgetown University
Washington, D.C.

Mr. Robert R. Fuchsberg
Division of Health Interview Statistics
National Center for Health Statistics
Department of Health, Education, and Welfare
Washington, D.C. 20201

Samuel I. Fuenning, M.D.
Chief Liaison Officer
American College Health Association
University of Nebraska
Lincoln, Nebraska

Dr. Richard F. Gaufin
Grants Associate
Division of Research Grants
National Institute of Health
1253 Stuart Road
Herndon, Virginia 22070

Mr. Naigzy Gebremedhin
Social Affairs Officer
Center for Housing Building and Planning
United Nations
New York, New York 10017

John R. Goldsmith, M.D.
Head, Environmental Epidemiology Unit
California State Department of Public Health
2151 Berkeley Way
Berkeley, California 94704

Mr. Peter T. Goldschmidt
Special Assistant for Government Relations
University of California Washington Office
1310 - 19th Street, N.W.
Washington, D.C. 20036

Professor Frank P. Grad
Legislative Drafting Research Fund
Columbia University
435 West 116th Street
New York, New York 10027

Mr. Peter Grenell
Project Assistant Manager
Self-Help, Inc.
Office of Scientific and Technological Information
264 Third Street
Cambridge, Massachusetts 02142

Mr. Hans R. Grigo
Technical Consultant
Home Department
National Safety Council
425 N. Michigan Avenue
Chicago, Illinois 60611

Mr. Robert Hale, Jr.
National Association of Housing and Redevelopment Office
The Watergate Building
2600 Virginia Avenue, N.W.
Washington, D.C. 20037

Dr. John F. Halldane
Chief, Psychophysics Section
Building Research Division, IAT
U.S. Department of Commerce National Bureau of Standards
Washington, D.C. 20234

John J. Hanlon, M.D.
Assistant Surgeon General
Deputy Administrator
Environmental Health Service
Rockville, Maryland 20852

Mr. David B. Hattis
Research Architect
National Bureau of Standards
U.S. Department of Commerce
Washington, D.C. 20234

Mrs. Joan M. Holcombe
Research Planner
O.K.I. Regional Planning Authority
222 Central Parkway
Cincinnati, Ohio 45202

Mr. Malcolm Hope
Deputy, Environmental Health
District of Columbia Health Department
Washington, D.C.

Mr. Charles Howard
Head, Field Services
Department of Urban Affairs
Hall of Administration, Room 372
500 West Temple Street
Los Angeles, California 90022

Mr. Dale Imus
Chief, Code Enforcement
Department of Urban Affairs
Hall of Administration, Room 372
500 West Temple Street
Los Angeles, California 90022

Mr. Francis A. Jacocks
DHEW, Environmental Control Administration
12720 Twinbrook Parkway
Rockville, Maryland 20852

Mr. Emil F. Jason
Assistant to the Chancellor
Southern Illinois University
Edwardsville, Illinois 62025

Mr. Ralph J. Johnson
Staff Vice President
NAHB Reearch Foundation, Inc.
627 Southlawn Avenue
Rockville, Maryland 20853

Professor Barclay G. Jones
Acting Director
Center for Housing and Environmental Studies
Cornell University
Ithaca, New York 14850

Miss Coryl LaRue Jones
Architectural Research Officer
National Institute of Mental Health
5401 Westbard
Bethesda, Maryland 20015

Mr. Herbert H. Jones
Associate Chief
NNS-BOSH-EHS
1014 Broadway
Cincinnati, Ohio

Edward Kaiser, Ph.D.
Center for Urban and Regional Studies
Institute for Research in Social Science
University of North Carolina
Chapel Hill, North Carolina 27514

Mr. Frederick S. Kent
Associate Deputy Commissioner
Environmental Health Service
City of New York Department of Health
125 Worth Street
New York, New York 10013

Dr. Barry King
DHEW, Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Robert E. Knittel, Ph.D.
Research Associate
Community Development Services
Southern Illinois University
Carbondale, Illinois 62901

Dr. George J. Kupchik
Director, Environmental Health
American Public Health Association
1740 Broadway
New York, New York 10019

Mr. J. N. Lanoix
Chief, Sanitation Services and Housing
World Health Organization
Avenue Appie
1211 Geneva, Switzerland

Mrs. Camille Le Long
Statistical Office
United Nations
New York, New York 10017

Paul V. Lemkau, M.D.
Professor, Department of Mental Health
Johns Hopkins University
615 North Wolfe Street
Baltimore, Maryland 21205

Mr. Sidney Leopold
Grants Program Office
Bureau of Community Environmental Management
Public Health Service
12720 Twinbrook Parkway
Rockville, Maryland 20852

Dr. Robert Lewis
Michigan State Department of Health
Lansing, Michigan

Dr. M. Y. Longley
Institute of Gas Technology
17 West 34th Street
Chicago, Illinois 60616

William C. Loring, Ph.D.
DHEW, Environmental Control Administration
12720 Twinbrook Parkway
Rockville, Maryland 20852

Dr. Carl S. Lossau
Associate Professor
Southern Illinois University
Edwardsville, Illinois 62025

Mr. Samuel Lowry
Brown Engineering Company, Inc. Mail Shop 64
300 Sparkmen Drive
Huntsville, Alabama 35807

Professor Preston E. McNall, Jr.
Head, Mechanical Engineering
College of Engineering
109 Seaton Hall
Kansas State University
Manhattan, Kansas 66502

Mr. Andrew Mank
DHEW, Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Dr. A. Edmund Martin
Department of Health and Social Security
Alexander Fleming House
Elephant and Castle
London S.E. 1, England

Mr. Edward H. Matthei
Perkins and Will Partnership Architects
309 West Jackson Boulevard
Chicago, Illinois 60606

Berwyn F. Mattison, M.D.
Executive Director
American Public Health Association
1740 Broadway
New York, New York 10019

Mr. Arthur E. Meling
Director, Municipal and Government Relations
Air-Conditioning and Refrigeration Institute
1815 North Fort Myer Drive
Arlington, Virginia 22209

Mr. Hugh Mields
Apt. 405, 1712 Eye Street, N.W.
Washington, D.C.

Dr. Robert E. Mitchell
Director, Survey Data Center
Florida State University
620 Bellamy Building
Tallahassee, Florida 32306

Professor Frank G. Mittelbach
Housing, Real Estate, and Urban Development
3250 GBA
University of California, Los Angeles
Los Angeles, California 90024

Dr. Eric Mood
Department of Epidemiology and Public Health
School of Medicine
Yale University
60 College Street
New Haven, Connecticut 06510

Dr. Eric G. Moore
Assistant Professor
Department of Geography
College of Arts and Sciences
Northwestern University
Evanston, Illinois 60201

Mr. Jack Morrison
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Raymond Neutra, M.D.
Department of Epidemiology
School of Public Health
Harvard University
665 Huntington Avenue
Boston, Massachusetts 02115

Miss Priscilla Newell
Community Development Specialist
Georgetown University
1603 Washington Plaza West
Reston, Virginia

Mr. Robert Novick
Director, Bureau of Community Environmental Management
Environmental Control Administration
12720 Twinbrook Parkway
Rockville, Maryland 20852

Mr. Floyd Oglesbay
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Mr. Michael Oliva
Injury Study Unit
University of Colorado Medical Center
4200 East 9th Avenue
Denver, Colorado 80220

Dr. Spencer D. Parratt
Political Science Department
Syracuse University
Syracuse, New York 13210

Mr. Alfred A. Perry
Director, Operation BREAKTHROUGH
Office of the Assistant Secretary for Research and Technology
Department of Housing and Urban Development
Washington, D.C. 20410

Dr. Paul Q. Peterson
Deputy Surgeon General
Public Health Service
Department of Health, Education, and Welfare
Washington, D.C. 20201

Dr. Lawrence A. Plumlee
Medical Science Advisor
Environmental Health Service
5600 Fishers Lane
Rockville, Maryland 20852

Robert S. Pogrund, Ph.D.
School of Public Health
University of California, Los Angeles
Los Angeles, California 90024

Mr. Abba I. Polangin
Director, Institute of Environmental Design
National Association of Home Builders
1625 - L Street, N.W.
Washington, D.C. 20036

Mr. Jerome Pratter
203 North Meramec Avenue
St. Louis, Missouri 63105

P. Walton Purdom, Ph.D.
Professor and Director
Environmental Engineering and Science
Drexel Institute of Technology
32nd and Chestnut Streets
Philadelphia, Pennsylvania 19104

Mr. B. F. Reiner
Officer-in-Charge
Environment and Housing Division
United Nations Economic Commission for Europe
Palais des Nations
CH-1211 Geneva 10, Switzerland

Mr. John Renner
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Dr. Courtney Riordan
Assistant Professor
Cornell University
Ithaca, New York 14850

Mr. A. F. Robertson
National Bureau of Standards
U.S. Department of Commerce
Washington, D.C.

Dr. Ira Robinson
Chairman, City and Regional Planning
University of Southern California
University Park
Los Angeles, California 90007

Ing Cesar Quintana Romero
Dirrecion General de Malariologia
Ministerio de Sanidad Y Asistencia Social
Centro Simon Bolivar
Caracas, Venezuela

Mr. Joel Rosenblatt
Research Staff
The Urban Institute
2100 M Street, N.M.
Washington, D.C. 20037

Mrs. Elizabeth Voss Routt
Scientist Assistant
Community Environmental Management
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Mr. Arthur Rubin
Research Psychologist
National Bureau of Standards
16616 Kipling Road
Rockville, Maryland 20855

Mr. Joseph A. Salvato, Jr.
Associate Director
State of New York Department of Health
Division of General Engineering and Radiological Health
845 Central Avenue
Albany, New York 12206

Mr. A. F. Schaplowsky
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Mrs. Clara G. Schiffer
Program Analyst
Office of the Assistant Secretary for Planning and Evaluation
Department of Health, Education, and Welfare
Washington, D.C. 20201

Mr. Joseph Schock
Acting Director, Division of Environmental Improvement
BCHM
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Dr. Kermit K. Schooler
Associate Professor of Research
Florence Heller Graduate School for Advanced Studies in Social Welfare
Brandeis University
Waltham, Massachusetts 02154

Mr. T. J. Schultz
50 Moulton Street
Cambridge, Massachusetts

Mr. Joseph Selove
Assistant Director, Housing Division
U.S. Census Bureau
Washington, D.C. 20233

Mr. Charles L. Senn, P.E.
School of Public Health
University of California, Los Angeles
Los Angeles, California 90024

Professor Moshé Shapiro
School of Public Health
University of Pittsburgh
Pittsburgh, Pennsylvania 15213

Mr. James C. Shipley
District Engineer
V.A. Fire Marshall's Office
Alexandria, Virginia

Mr. James Simpson
Director, Office of Building Technology
HUD Building, Room 4206
451 Seventh Street, S.W.
Washington, D.C. 20410

Dr. William M. Smith
1908 - #3 Rosemary Hills Drive
Silver Springs, Maryland 20910

Professor Anatole A. Solow
Department of Planning
Graduate School of Public and International Affairs
University of Pittsburgh
Pittsburgh, Pennsylvania 15213

Mr. Roy Spillenkothen
Environmental Control Administration
5555 Ridge Avenue
Cincinnati, Ohio 45213

Dr. Wilbur A. Steger
Consad Research Corporation
5600 Forward Avenue
Pittsburgh, Pennsylvania 15217

Mr. Albert H. Stevenson
Chief Engineer & Deputy Administrator
Environmental Health Service
Public Health Service
Rockville, Maryland 20582

Mr. Kenneth C. Stewart
Graduate School of Public Health
University of Pittsburgh
Pittsburgh, Pennsylvania 15213

Mr. Kent Stiner
Distribution and Control Group
I.T.E.
Imperial Corporation
233 Lancaster Avenue
Ardmore, Pennsylvania 19003

Dr. Jan A. J. Stolwijk
Professor, Department of Epidemiology and Public Health
Yale University and
Rep., John B. Pierce Foundation
290 Congress Avenue
New Haven, Connecticut 06519

Mr. Oscar Sutermeister
HUD Building, Room 7140
451 Seventh Street, S.W.
Washington, D.C. 20410

Mrs. Olive H. Swinney
Social Rehabilitation Service
Department of Health, Education, and Welfare
North Building, HEW
Washington, D.C. 20201

Mr. S. Tudor Strang
Codes & Rehabilitation Division
U.S. Department of Housing and Urban Development
451 Seventh Street, N.W.
Washington, D.C. 20410

Mr. Archibald Tewarson
Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
Norwood, Massachusetts 02062

Dr. Sven Thiberg
Tjansteforsandelse
Kungl. Tekniska Hogskolen
100 44
Stockholm 70, Sweden

Mr. John Turner
Department of Urban Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dr. O. M. Ungers
Professor and Chairman, Department of Architecture
Cornell University
139 E. Sibley Hall
Ithaca, New York 14850

Mr. Bailus Walker, Jr.
Deputy Health Commissioner for Environmental Health
Department of Public Health and Welfare
City of Cleveland
Cleveland, Ohio

Mr. Ralph Warburton
Chairman, Joint Working Group for Uniform Housing Design and Construction Standards
Department of Housing and Urban Development
Washington, D.C. 20410

Barry Wellar, Ph.D.
Government Research Center
University of Kansas
Lawrence, Kansas 66044

Dr. William L. C. Wheaton
Dean, College of Environmental Design
University of California
Berkeley, California 94720

Mr. Gerald G. Wheeler
National Institute of Mental Health
Bethesda, Maryland

Daniel M. Wilner, Ph.D.
Acting Dean, School of Public Health
University of California, Los Angeles
Los Angeles, California 90024

Mr. George E. Winzer
Physicist
Department of Housing and Urban Development
451 Seventh Street, S.W.
Washington, D.C. 20410

Mr. David B. Wolfe
U.S. News Service
4405 E. W. Highway
Bethesda, Maryland

Mr. Jackson T. Wright, Sr.
Director, Housing Programs
American Institute of Architects
1735 New York Avenue
Washington, D.C. 20008

Mr. David Yentis
Office of Deputy Undersecretary Ross
U.S. Department of Housing and Urban Development
Washington, D.C. 20410

Mr. Arthur Young
Chief, Housing Division
U.S. Bureau of Census
Washington, D.C. 20233

Mr. Calvin H. Yuill
Southwest Research Institute
8500 Culebra Road
San Antonio, Texas 78228

☆ U. S. GOVERNMENT PRINTING OFFICE : 1970—436-614/56